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UNITED STATES ARMY

AVIATION DIGEST

FEBRUARY 1978

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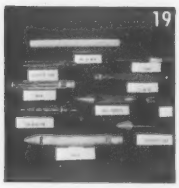
UNITED STATES ARMY AVIATION DIGEST

FEBRUARY 1978 VOLUME 24 NUMBER 2



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Richard K. Tierney
EDITOR
U.S. ARMY AVIATION DIGEST

ABOUT THE COVER

"Aeroscout Training," by MG James C. Smith, starts on page 2. Illustration by Fred Martin

The mission of the *U.S. ARMY AVIATION DIGEST* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

The *DIGEST* is an official Department of the Army periodical published monthly under the supervision of the Commanding General, U.S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army nor the U.S. Army Aviation Center. Photos are U.S. Army unless otherwise specified. Material may be reprinted provided credit is given to the *DIGEST* and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, *U.S. ARMY AVIATION DIGEST*, Fort Rucker, AL 36362.

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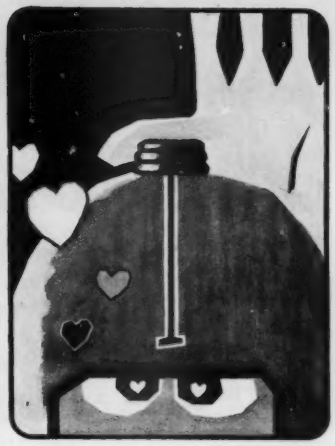
VIEWS FROM READERS



Sir:

The Aviation Systems Command (AVSCOM) was phased out of existance 1 July 1977 and two new commands were established. These two new commands are: the U.S. Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) and the Aviation Research and Development Command (AVRADCOM). TSARCOM is responsible from the Materiel Readiness viewpoint and AVRADCOM from the Research and Development aspect. A new element was added to AVRADCOM, that of R&D for Aviation Life Support Equipment (ALSE) and this responsibility now falls under the Safety and Survivability Branch of the Directorate for Development and Engineering. The ALSE section is staffed with three persons, and all field units and commanders should assure that all requirements (ROCs, LRs and LOAs) are furnished AVRADCOM, ATTN: DRDAV-EXS, for coordination. Any questions concerning the field's ALSE R&D needs should also be addressed to: CDR, USAAVRADCOM, ATTN: DRDAV-EXS, P.O. Box 209, St. Louis, MO 63166. Points of contact are: Mr. Leonard Cuchna, General Engineer; Mr. Danny Sabo, Aerospace Engineer; and Mr. Bob Matthews, Aerospace Engineering Technician. These individuals can be reached on AUTOVON 698-6606.

Problems/questions concerning Life Cycle Management of ALSE should continue to be directed to the DARCOM Project Officer for Aviation Life Support Equipment (DRCPO-ALSE), P.O. Box 209, St. Louis, MO 63166 and "PEARL" at the same address or by telephone to AUTOVON 698-3241 or 3291.

Bob Matthews
HQ AVRADCOM
St. Louis, MO 63166

Sir:

Digging through all the old orders brought many, many names and faces to focus – and nostalgia is the Order of the Day!

Here's why: Rated as a Liaison pilot by Special Order No. 84, HQ AGF, Washington, DC dated 31 March 1943 confirming VOCG, AGF of 13 March 1943 of Personnel Orders No. 61, HQ AAF dated 12 March 1943.

I was fortunate to be in the first Artillery OCS class from which members were accepted for flight training with the AAF Liaison Pilot Training School at Denton, Texas; reporting for the first flight on 24 December 1942. We were known there as Class L-5 and later at Fort Sill, OK as Class P-19. I was graduated in April 1943 with a grand total of 65 flying hours. While I was learning "how to fly" with the AAF, the Tactics Class at Fort Sill was then known as the school which "taught you how *NOT* to fly...and survive."

This month I celebrate 35 years in Army aviation as, in a sense, I am "still on active duty with the Army" in my capacity as a Flight Test Pilot (DAC) with the Aircraft Maintenance Branch, Maintenance Division, DIO here at Fort Hood, TX. And the same joy of flight is mine when I roll the throttle on a Cobra as it was the first time I pushed the knob forward on the old Cub in '42.

Keep 'em safe and flying and as always ABOVE THE BEST!

Major Billy B. McPhail
USAR, Retired
1308 Pine Drive
Killeen, TX 76541

Sir:

Reference the back cover of your July 77 *DIGEST*, title "A Moment to Relax and Reflect."

I do not know any other Liaison Pilot on active duty, but I do know that this date marked the retirement party for LTC John Sarko, State Aviation Officer, WI ARNG. John went through Liaison Pilot School in "The Class Before One." A little research along that line might prove interesting.

COL L.L. Hamacher Jr.
660 Airport Road
Decatur, IL 62521

Continued on page 7

Aeroscout Training

Major General James C. Smith
Commander
U. S. Army Aviation Center
Ft. Rucker, AL

IN THE DECEMBER and January issues, the *AVIATION DIGEST* reprinted two timely and significant articles from *ARMOR* magazine. The first, "The Indispensable Scout," was written by Brigadier General David K. Doyle, Assistant Commandant of the U.S. Armor School. The second article, "We'll Have No Problem Finding the Enemy – Right?" was coauthored by General Doyle and Major William V. Chairamonte of the Armor School. Both articles address the key to combat effectiveness – the Scout, the eyes and ears of the commander on the battlefield.

Army aviation has long endorsed the points discussed by General Doyle and Major Chairamonte. In fact Army aviation has been foremost among the advocates of highly mobile and flexible scouts on the battlefield since airmobile tactics began to emerge at the U.S. Army Aviation Center, Ft. Rucker, AL in the early 1950s.

To supplement the ground Scout in meeting the comprehensive mission requirements of reconnaissance, security and economy-of-force tasks the Aeroscout concept developed by Army aviation lends a versatility vital to victory in the fluid battlefield environment of tomorrow.

With a realistic prospective of the strengths and capabilities of opposing forces in the next conflict, the U.S. Army has determined that it must be prepared to fight outnumbered and win. To accomplish this we must outmaneuver the enemy and concentrate our forces at critical points and at the crucial times. These well worn phrases will be nothing more than bravado unless we provide our commanders the tools they need to obtain the timely intelligence information so necessary to "seeing the battlefield."

Air cavalry moving to gain contact and report will provide the commander with the real time intelligence data, security against surprise attack, and the effective means for economy of force operations essential to highly mobile warfare.

To meet the commander's needs and provide air cavalry units with Aeroscout qualified pilots now, the Army Aviation Center has developed an Aeroscout qualification track for the Initial Entry Rotary Wing Qualification Course. (See "Dual Track 175/40 IERW Course," November 1977, *DIGEST*.)

Next month the Army Aviation Center will graduate the first class of Initial Entry Rotary Wing (IERW) students, who have undergone training in this new Dual Track Course.

Among the graduates will be about 10 students who have earned the additional skill identifier (ASI) of D. These Aeroscout qualified graduates will be a product of the Aeroscout Track of the Dual Track Course.

Consisting of 8 weeks and 60 flight hours the Aeroscout phase begins in the student's 25th week of flight training. Prior to this phase of the course both Aeroscout and Utility pilot students have received common training.

The selection of those students qualified to undergo the Aeroscout training begins in the 10th week of IERW training. The primary flight instructors submit recommendations concerning the student's flight ability and potential for Aeroscout training. One of these later is combined with recommendations received from the instructor pilots in the 14th week and in the case of the warrant officer candidates a recommendation from the company tac officer. An additional input is gained through the use of questionnaires indicating the student's desires. This information is combined with the academic grades of the students to produce a rating list of those most eligible. This list is sent to

MILPERCEN (Military Personnel Center) where four officers and six warrant officers are selected as primary to receive Aeroscout training. Four additional students are selected to provide alternates. (See "Scout Aviator Selection," in January 1978, *DIGEST*.)

Aeroscout flight line instruction is supported by 27 hours of Aeroscout tactical academics. Classroom instruction includes training in Soviet Organization for Combat, Air Cavalry Operations, Attack Helicopter Operations and Aerial Adjustment of Artillery. Another important area of instruction includes the operations of ground maneuver units, especially ground reconnaissance. Instruction is from an Aeroscout viewpoint and builds on the 70 hours of common tactical academics taught both Utility and Aeroscout students earlier.

Flight line instruction is designed to put many of the tactical concepts learned in the classroom to practical use. Aeroscout students begin their 8-week phase by transitioning into the Scout helicopter, the OH-58 Kiowa. This transition training includes 13 hours of aircraft maintenance systems. Following the transition stage the students begin the combat skills maneuver training, including attaining proficiency in terrain flight with the emphasis on nap-of-the-earth (NOE).

Skills considered essential to meet the battlefield needs of the future high threat environment are practiced as the students gain proficiency in attack helicopter operations with the selection of attack helicopter firing positions, and target handoff. Some of these flight periods will be practiced in conjunction with AH-1 Cobra training. This provides the students an opportunity to work directly with attack helicopters.

Fort Rucker's target acquisition range is being designed to provide Aeroscout students an opportunity to practice reconnaisance missions and to exercise their reporting requirements. The range is being equipped with lifesize silhouette targets of Warsaw Pact threat equipment which students will be required to acquire, identify and report while they maintain their aircraft in the NOE flight mode.

Proficiency in night flight is the objective of the flight instruction devoted to terrain flight at night with and without the AN/PVS-5 night vision goggles (NVG). In the future the majority of the NVG training will be conducted during the day, using a filtering device which simulates a night environment as seen through the goggles. This allows instructor pilots to teach without being encumbered with the goggles and allows them to provide students with safer, more realistic training.

Live artillery adjustment is planned to provide students with the opportunity to call for and adjust 105 mm artillery while maintaining aircraft control in the NOE environment. Each student will be required to show proficiency in the adjustment of about nine HE (high explosive) rounds.

The Aeroscout training phase will culminate in a series of security missions where the students will demonstrate their proficiency in interpreting a mission order, planning their flight using the most appropriate terrain flight mode, and in the correct execution of the mission.

Aeroscout training at Fort Rucker has been designed with input from the field to provide the gaining units with Aeroscout pilots who are tactically proficient in the comprehensive mission roles they will be encountering. Program changes will be made as the doctrine and mission require. Unit input as to the quality of the product and recommended changes are going to be critical in the maintenance of a realistic training program at the Aviation Center. The Aeroscout concept is ever more critical in this aspect, as doctrine and tactical concept are evolving in the field through unit training.

Aeroscout units are encouraged to provide input to the Aviation Center as field experience is gained. Send your comments to: CDR, USAAVNC, ATTN: ATZQ-TD-CD, Ft. Rucker, AL 36362, or call AUTOVON 558-3703/3119.

RELAX and live

Dennis R. Brightwell, M.D.
Veterans Administration Hospital
Lexington, KY

POTENTIALLY stressful events occur every day ... at work, at home and even during recreation. By the very nature of their job, aviators are exposed to many more potentially stressful situations than the average person. And as aircraft become increasingly sophisticated machines capable of performing more complex flying maneuvers, possible stresses will increase dramatically.

Anxiety is a person's response to stressful conditions. We all experience it to some degree. Some just seem to be more anxious than others. They respond with more anxiety after stressful events than most. Some people have more difficulty tolerating anxiety; they don't seem to be able to relax as well after a stressful occurrence. Some then resort to alcohol or drugs to deal with stress. *Both* of these create special problems in the aviation environment and must be avoided. But what else is there? What can a person do about stress and anxiety?

We all agree that using alcohol or drugs to deal with our anxieties is unhealthy and possibly dangerous. And the thought of 3 or 4 years on a psychiatrist's couch probably makes you feel worse, not better. Well, there are two very simple and easy-to-use techniques which are described below in enough detail for you to use either or both of them. They can help *anyone* learn to relax more effectively and to deal with stress and anxiety in a healthy and absolutely safe fashion.

Progression Relaxation. The *first* of these is generally called *progressive relaxation.* It was developed by Edmund Jacobson more than 50 years ago and has been widely used in various settings and proven effective through the years. It is based on the idea that people can become relaxed if they are aware of their physical state. To develop this awareness, you first need to practice becoming tense and then relaxed.

By tensing muscle groups and then relaxing them, you can become aware of the way your body feels when it is tense. Soon, with practice, it becomes a simple matter to recognize tension and then simply relax your muscles and feel better. It should be obvious that you can't be anxious and relaxed at the same time.

To become skillful at progressive relaxation requires some repetition and you shouldn't expect to be perfect initially. Each session takes about 20 minutes. If you practice once or twice a day, in about 10 days you'll find yourself able to become very relaxed in 10 to 15 minutes – and easily able to identify tension that occurs outside the relaxation sessions.

The basic step is alternating tension with relaxation of various muscle groups. For example, you might start with your right forearm and hand. First clench your muscles – clench them tightly and study the tension. Hold it for about 5 to 10 seconds and then completely relax. Notice the difference. Note how good your hand feels when it is relaxed and be aware of how relaxation differs from tension. Repeat this about three times and then go on to another muscle group.

This time bend your right arm at the elbow and tense your biceps muscle. Notice the tension and hold it for about 5 to 10 seconds and then relax. Repeat this about three times and move on to the triceps, which you can flex by straightening your arm. The accompanying chart gives a good sequence of muscle groups through which to progress. Initially, the whole exercise should take 20 to 25 minutes. Eventually, you should be able to do the whole thing and become completely relaxed in 10 to 15 minutes. You won't always need to tense and relax your muscles as many times to achieve the deep relaxation you are seeking.

Continued on page 52

Another First For Army Guard Aviation

ON 7 APRIL 1977 a milestone was reached in aircraft engine testing. The first T-73-P1 from a CH-54A Skycrane was operationally run on the Modular Engine Test Stand (METS) at the Transportation Aircraft Repair Shop (TARS), Springfield, MO.

Prior to starting the engine certain modifications to the METS shelter were made, such as air ducting for cooling and deflecting shields for the intense heat generated by the largest turbine engine utilized on Army Guard aircraft. The test was observed by several members of the Aviation Systems Command, including Larry Swann, CH-54 Item Manager for U. S. Army Troop Support and Aviation Materiel Readiness Command (TSARCOM).

One of six in the Army's inventory and the only one in the National Guard, the METS has been in operation at the MO-TARS since September 1976. With the METS the Army Guard now has the capability to operate and analyze all turbine engines currently in the Guard's inventory.

The METS serves the entire Army Guard system and engines are inducted into the METS program through the states supporting TARS. The MO-TARS, in conjunction with the National Guard Bureau, Aviation Logistic Center, has established a monitoring system for the program to ensure both quality and cost effective operation of engines processed through the METS.

The program's objective is to preclude aircraft engines from being returned to the overhaul facility unnecessarily. It sill save the Guard system the cost of overhaul and increase the overall operational readiness posture of Army Guard aviation assets.

Above: The first T-73-P1 engine operationally run on the METS seen through the window of the instrumentation room. Below: Exterior view of the CH-54 Skycrane engine mounted on the METS; test leads and accessories are visible

Captain Jeffery C. Hovious
Directorate of Evaluation and Standardization
U. S. Army Aviation Center
Ft. Rucker, AL

IN ACCORDANCE with the provisions of AR 95-63, the U.S. Army Aviation Standardization Policy Board met in the Office, Deputy Chief of Staff for Military Operations (ODCSOPS) conference room, Pentagon, Washington, DC, 27 to 28 September 1977. Members present were representatives from agencies and commands listed in paragraph 1-5, AR 95-63.

The conference was opened by Brigadier General Charles E. Canedy, Army Aviation Officer, who observed that a review of the tasking requirements generated by the 1976 conference show that the Board was indeed an action forum; and, again this year, the minutes would be submitted to the Army Chief of Staff for approval and tasking. Major General James C. Smith, Commander, U.S. Army Aviation Center (USAAVNC), Ft. Rucker, AL, indorsed General Canedy's comments concerning the Policy Board of the previous year.

Lieutenant General Edward C. Meyer, DCSOPS, stated that "training" was added to the conference title because it is related closely to standardization, safety and applicable to unit readiness. General Meyer further stated that the Board has made significant contributions to the solution of aviation-related problems. Our biggest problem now is how to articulate the relationship of the flying hour program to training and readiness in aviation units. He pointed out that the Aircrew Training Manuals (ATMs) are in the field and that they are new manuals; and, when errors are found in them, summit corrections. Like everything else, aviation will have to go through the developmental process to get the best product.

General Meyer indicated that the board should look at interoperability in North Atlantic Treaty Organization (NATO) operations. The Army will see a great thrust in the next year towards this. Aviation units should have European standing operating procedures (SOPs) so that there will be no delay in time when units get there in being combat ready. General Meyer closed his comments with the question, "How is our safety record?" Colonel Keith Rynott, U.S. Army Agency for Aviation Safety (USAAAVS) stated that the helicopter rate is down but fixed wing is up. General Canedy interjected that we are paying so much attention to helicopters that we are forgetting about fixed wing.

Special briefings presented:

• **Flight Information Publications (FLIPs)** was presented by Colonel Elliott, U.S. Army Air Traffic Control Activity (USAATCA). He presented several items of general interest

concerning new products and proposed changes to present products. A major subject was the Continental United States (CONUS) Meteorological Data System (COMEDS) and how the U.S. Army will benefit from this program in receiving Notices to Airmen (NOTAMs).

• **Intelligence Aircraft Operations** was presented by Lieutenant Colonel Taylor, U.S. Army Intelligence Command (INSCOM). He presented unique problems associated with the safety, standardization and training operations of the RU-21, OV-1 and RV-1 aircraft. The briefing included high altitude operation, physiological experiences, life support equipment and aircrew survivability equipment utilization.

• **Warrant Officer Promotion Status** was presented by Lieutenant Colonel Furney, USAAVNC (see January 1978 *DIGEST*). He presented the overall warrant officer promotion system to include: up-or-out policy; need for more experience (senior warrants) in all aviation units questioning the adequacy of qualifications for the initial entry rotary wing course; retention rates after completion of initial obligation; and prerequisites for advanced qualifications.

• **Distribution of Warrant Officers** was presented by CW4 Washer, Military Personnel Center (MILPERCEN). He presented the method by which MILPERCEN tracks the assignment of warrant officers. He explained grade distribution, aircraft qualifications and skill training. He explained the provisions of Department of the Army Circular 611-58, which changes AR 611-112 effective 1 April 78.

• **Aircrew Training Manual (ATM)** was presented by Major Brennan, USAAVNC. He discussed the concept and implementation of the ATMs. The discussion brought out that both the active and Reserve components came under ATMs effective 1 October 1977 and that the combat readiness flying requirements will be eliminated from AR 95-1 and are not requirements for fiscal year 1978. General Smith indicated that the ATMs are a management tool and will provide standardized readiness training for aviation units. At unit level, the commander will be able to identify impact of flying hour cuts on readiness. If a unit commander receives only 95 percent of the programed flying hours, the commander must determine how to manage this cut and mimimize its effect on readiness. Now the commander has the means to show how this cut affects readiness; in the past, aviation commanders were not able to do this.

The Board discussed many proposed changes to AR 95-1 and AR 95-63. The major command or agency that proposed the change presented reasons for the change; then the Board collectively decided whether or not the regulation would be changed. The changes will be incorporated in Change 1 to AR 95-1 and AR 95-63 and should be in the field around 1 March 1978.

VFR Continued from page 1

Sir:

Major Herndon's article, "Why Inadvertent IMC," in the September 77 *DIGEST*, was well written and offered a realistic appraisal of the problem. However, I believe some of his points are worthy of further discussion.

First of all, so long as we operate at night, there will always be the possibility of encountering inadvertent IMC. To a lesser degree, we can say the same about operating in marginal conditions in the daytime.

In the area of solutions I heartily endorse the importance attached to the first of the 5 C's – Control. MAJ Herndon states correctly, "...control is established by cross-checking the flight instruments – first, the attitude indicator to ensure the aircraft is level; next the heading indicator to ensure that the selected heading is being maintained...." Despite this knowledge and case after case of tragic experience AR 95-1 still permits aircraft to operate at night and in extremely marginal weather without an attitude indicator or heading indicator! How many times has a flight leader given an "inadvertent" IMC break-up procedure in preparation for a formation flight when only 2 out of the 5 aircraft were instrument equipped? That's about as valid as giving passengers a briefing on the use of LPU's and then telling them the LPU's are not available.

Another area that should be of concern is our on-again, off-again attitude toward pilot instrument qualification. Some are saying, "I don't need to be instrument qualified. All I need is enough to get me home." Pilots who make this statement don't seem to realize that the aircraft control ability necessary to pass an instrument checkride is also the *minimum* aircraft control ability necessary to assure survival in case of inadvertent IMC.

CW4 Carl L. Hess
14th Aviation Company
APO NY 09827

LEADERSHIP
PERSONAL INFLUENCE
Good Example
MAGNETISM-
power to prevent accidents

USAAAVS

EVER SINCE THE discovery of loadstone, man has been intrigued by the phenomena associated with magnetism. Initially an object of idle curiosity, the magnet has evolved into a functional necessity, profoundly influencing our lives. In the compass, magnetic force serves to guide us; in the telephone, radio and television set, to communicate; in ignition coils and magnetos, to spark our gasoline engines; in generators, to light our cities; in electric motors, to operate our appliances. The list goes on and on. Yet, despite our daily reliance on this invisible force, we are seldom conscious of its existence. Maybe that is why it has taken us so long to discover that magnetic power can also be used to prevent accidents.

Obviously, the type of magnetism that can prevent mishaps is somewhat different from that associated with loadstone or produced by the flow of electric current. Nevertheless, it is magnetism just the same. We call it personal influence.

While the force exerted by personal influence cannot be measured in units of newtons or dynes, the results it produces serve as positive proof of its existence. And don't underestimate its power. It is one of the most effective safety tools available. Unfortunately, misused it can cause accidents just as readily as it can prevent them.

Whether or not we realize it, each of us radiates this magnetic power during all our waking hours. We can't turn it off. Consequently, we can apply this force either in a positive manner to enhance safety or in a negative way to thwart it. That is our only control.

We transmit this personal magnetism in different ways: by example and instruction; by a positive or negative attitude; by request or directive coupled with some form of supervision; and even by complete indifference to a given situation. Often our physical presence is sufficient to exert a powerful influence on others. Have you ever been part of a group telling shady stories when a church minister unexpectedly walked in? What happened to those shady stories? How many teenagers are apt to remove hub caps from a parked car when a policeman is standing nearby? The point is clear: Personal influence, in one form or another, is an ever-present force that can be used constructively or destructively. Its proper application is essential to safety in Army aviation.

Some years ago, the commander of one aviation unit insinuated that it would "look good" if down time for scheduled PE inspections could be reduced. Obligingly, maintenance supervisors adopted a policy of returning aircraft to the flight line as soon as PE inspections were completed and signed off—even though long lists of discrepancies uncovered had not yet been cleared. These were left for flight line mechanics to correct. On paper, down time for scheduled inspections was substantially reduced. However, the end result was an increase in aircraft rejections by pilots as well as a rise in number of both in-flight problems and precautionary landings.

A somewhat similar situation arose when the commander of another aviation unit demanded a higher overall aircraft availability rate. The mechanics obliged him by taking every available shortcut they could devise. When excessive magneto drop could be corrected by opening the points, no further effort was made to determine and eliminate the true cause of the problem. If a landing gear oleo strut was low, it was inflated to the proper extension without ensuring the piston seals were serviceable and hydraulic fluid had not been lost. Likewise, mechanics used torque wrenches if they were handy; otherwise, they relied on the sense of "feel"—except when the item being torqued happened to be a critical one. This kind of hurry-up maintenance increased aircraft availability for only a short time. As could have been predicted, the end result was an increase in number of pilot writeups, aborted missions, and unscheduled maintenance.

Yet, these aren't isolated instances. Each year we are confronted with problems of a similar nature. How many emergencies and mishaps have occurred because a mechanic failed to install a cotter pin? A connection was improperly tightened? A hydraulic line was inadequately secured? An inspector was lax? An MWO was not complied with?

We don't teach bad habits in the classroom. We don't show a student how to force a part in place. We don't allow him to service an aircraft until he has properly grounded it; nor do we encourage

him to perform maintenance without referring to appropriate technical manuals. Neither do we permit him to run up an aircraft unless it is in a designated runup area, or to taxi in a congested area without using wingwalkers.

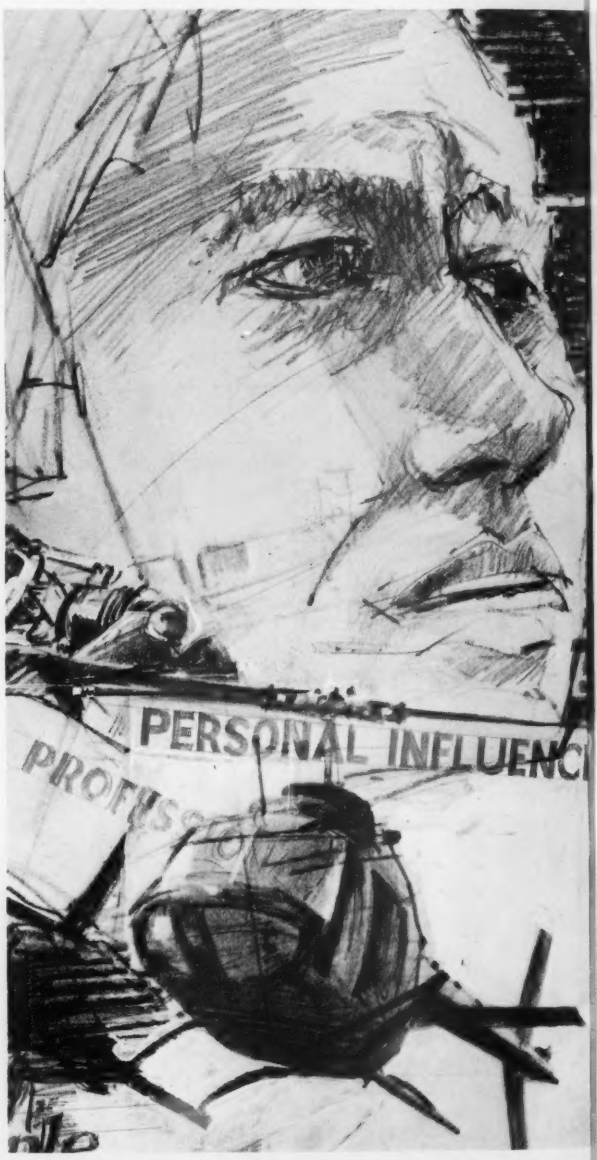
And the mechanic is not to be singled out. Pilots and other aviation-related personnel are equally vulnerable to temptations that drastically affect safety. More than 20 years ago, one student pilot decided to put on a "special" show for his girlfriend's benefit. After performing a series of aerobatic maneuvers over her house, he came in low, rolled his aircraft inverted – and promptly nosed into the ground. Approximately five years later, another pilot decided to put on a one-man performance for his family who were spending the day at the beach. During a sharp pullup and tight turn following a near-ground-level pass, the aircraft stalled and crashed before the eyes of the pilot's horrified wife and children.

During the same time frame, another pilot lifted off in IMC on a VFR flight plan. Severe turbulence, thunderstorms and possible tornadoes were forecast. He crashed shortly after takeoff. His urgency? To return a borrowed aircraft.

Prior to each of these missions, others knew of the pilot's intent. Yet, no one made any effort to prevent any of these flights or even advise against them. Could this silence have been interpreted as consent? One thing is certain: Analysis of these and other accidents clearly establishes the human element as the predominant accident cause factor.

Granted, a fuel pump shaft can shear and cause fuel starvation. This has happened. But what about the mechanic who plugs a disconnected fuel line with a candy wrapper, then forgets to remove it when he reconnects the line? When the engine is started, fuel pressure partially dislodges the plug, permitting full flow. Then at some point during flight, the wrapper blocks the line, causing engine failure and a major accident. This also has happened.

Failure of mechanics to properly connect quick disconnect fuel couplings and failure of pilots to perform proper preflight inspections have caused numerous accidents – some fatal. So has failure to either positively secure or remove all loose



items in helicopters scheduled to be flown with doors off.

And what about such common hazards as wires? Flying below minimum altitude in violation of unit SOP, failure to perform ground or air reconnaissance before landing at unfamiliar strips, and failure to mark locations are just a few causes of wire strike accidents. Recently, an aircraft on a low-level training mission struck wires and crashed. The pilot did not have a hazards map in his possession; had not received a thorough mission briefing; and was unsure as to the exact location of his landing zone, the altitude at which he would be flying, or the precise route he would follow. Any wonder the aircraft struck wires?

Where do such unsafe practices come from? Since bad habits are not taught, how do they develop? Is it left up to each individual to figure out how to violate regulations; disregard TMs, checklists, and procedures; and take unnecessary risks? Or does he get help from others? In far too many instances, human error can be traced to direct or indirect personal influence.

A hurry-up-and-get-the-plane-ready-I-don't-want-the-general-to-be-kept-waiting attitude cost one aircraft and several lives, including the general's.

A simple "they're rated" paired two inexperienced pilots for an administrative flight. The price? One aircraft.

The same type of result was attained by a He's-instrument-rated-so-put-him-on.

An I-can-catch-up-on-my-sleep-later attitude cost another pilot his life.

The veteran pilot who likes to display his ability to perform low-level maneuvers, disregard checklists and procedures, violate regulations, and take unnecessary risks is going to entice some new pilot to do likewise. Where the veteran pilot may get by on skill, the fledgling most probably will not. Eventually, the veteran will likely fall victim to a situation he helped create.

A few years ago, a training plane from a military installation made headlines when it smashed into the side of a bridge while supposedly in the landing pattern. Could the subsequent discovery that other pilots frequently tested their skill by flying under the bridge have had any bearing on this accident?

Can flying be 100 percent safe under all situations? Not any more than crossing the street or driving to work. In a combat environment, risk becomes an integral part of every mission. Marginal weather cannot be allowed to stop a flight necessary to evacuate wounded, or to supply reinforcements and equipment to men cut off from their unit by the enemy.

During World War II, a damaged C-47 was badly needed to evacuate personnel before advancing enemy troops. For lack of a spare wing, it was fitted with one from another type aircraft. Fortunately the "Gooney Bird" flew and saved a number of lives. Had it crashed, would the fate of those aboard have been any worse than at the hands of the enemy? But who, in his right mind, would authorize such a modification under less demanding circumstances?

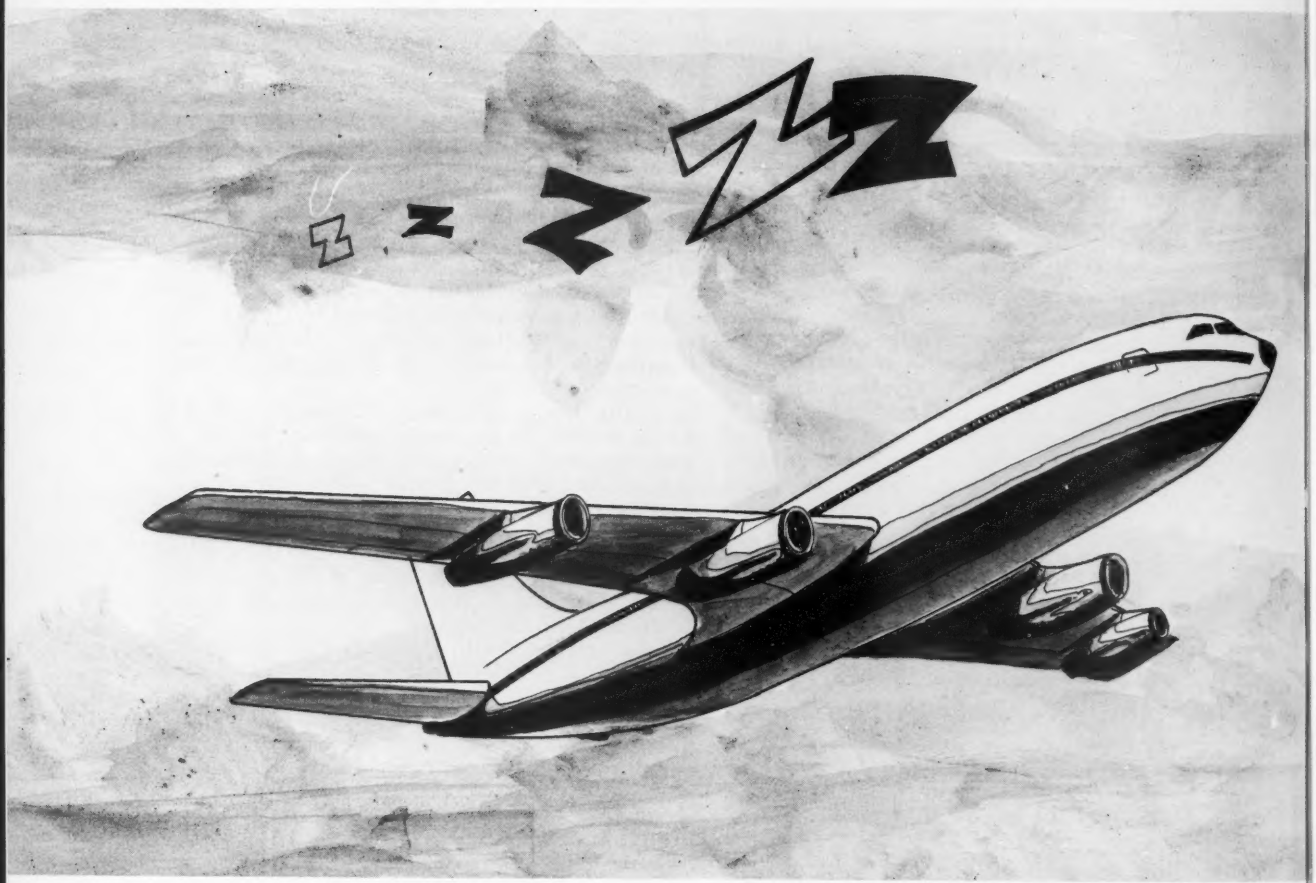
Valor, coupled with training, experience, and ingenuity, is a major factor in winning battles and saving lives. But valor should never replace common sense. We must always bear in mind that the new aviator, particularly the younger man, is endowed with an overabundance of vitality, curiosity, and an adventurous spirit. There is nothing he can't do – particularly if he is encouraged to do it, has seen it done, or is left to his design while he gains experience.

Influence should begin at the top. The commander who is conscientious; follows prescribed procedures; abides by regulations and exercises good judgment sets, by example, the course for his subordinates to follow. If he is lax; if he is guilty of breaking or bending regulations; if he does not select pilots to meet mission requirements; if he does not concern himself with conditions around his airfield; if he does not insist on each individual doing his job efficiently and in a professional manner, then he has lost his sense of direction. In time, those following him will lead others down the same path.

By our actions and words, by our refusal to lend the stamp of approval to improper methods or procedures, by the example we set, all of us have the power to prevent accidents through personal influence.

USAAAVS

Adapted from CROSSFEED



SINKING SPELLS

PICTURE THIS ONE. A 707 freighter, passing Las Vegas at the end of an all-night JFK-LAX nonstop, continues westbound at FL 390, ignoring the repeated descent clearances issued by LAX center. After considerable effort and anxiety, radio contact is established through Arinc when the aircraft is nearly 100 miles west of LAX. Fortunately, the SELCAL (Arinc selective callup) chimes are loud enough to awaken at least one of the three sleeping crewmembers, and there is enough fuel for a safe return to LAX. In another instance, a DC-6 crew spent half an hour circling Atlanta when they all fell asleep with the autopilot on and the turn knob out of the detent.

Cockpit slumber parties are one of the more dramatic effects of severe fatigue. Some will say

that such conduct is inexcusable. I wonder if that oversimplification serves to mask some very real physiological problems. Several things can contribute to those awful sinking spells, but some of these factors can be controlled.

Lack of sleep is the most obvious cause of pilot fatigue but sleep is a complex subject that scientists are only beginning to understand. Basically there are two significantly different types of sleep of interest to the aviator. Deep sleep predominates during the first half of a normal night's slumber and is characterized by very low electrical (EEG) activity in the brain. Rapid eye movement (REM) sleep begins after that initial three or four hours and is a totally different kind of sleep. During REM sleep, EEG activity is similar to that found in the waking state, plus there are rapid eye movements and evidence of dreaming.

Considerable research has established a clear need for both types of sleep. During several days of irregular working conditions, you may be able to satisfy deep sleep requirements and even maintain good efficiency while awake by napping for short periods. At the end of that time, your REM account will be overdrawn and that balance will need to be restored with at least one very long sleep. If, however, you miss an entire night's rest, you may be able to recover good vitality with a normal night's sleep plus one hour for the REM deficiency and an afternoon nap to balance the deep sleep account. I have found that 10 to 15 minutes of calisthenics after a short night's sleep is an excellent temporary substitute for lack of rest.

Another factor to consider is hypoglycemia or low blood sugar, which can cause malaise, fatigue, disorientation, and even lapse of consciousness. It is controllable with some very simple dietary tricks, but it helps to understand the mechanisms involved.

When you awake in the morning, your blood glucose level will be low from the overnight fast. If you start with coffee and sweet rolls, or any other highly refined carbohydrates, you may induce reactive hypoglycemia.

It works like this. Your system converts refined sugars and starches into glucose so rapidly that your blood sugar level rises at an abnormal rate. When the homeostatic system that balances glucose levels senses the sharp rate and rise, it signals the pancreas to release insulin proportionately. In this case, the rate is abrupt and can only be sustained over the very brief time it takes for your body to convert the highly refined carbohydrates to glucose. The end result is that too much insulin is triggered to the bloodstream so that your glucose volume is soon driven well below the original, fasting level.

Proteins from a more normal breakfast are processed by the body at a much more steady rate so that appropriate quantities of insulin are metered out to stabilize glucose levels at the optimum point. Protein reduction and conversion continues for several hours and eliminates the peaks and rebounds induced by pure carbohydrate intake. Four dietary practices will prevent reactive hypoglycemia:

- Avoid refined carbohydrates (sugar and all refined starches).
- Eat protein-rich meals every four hours, especially when on flight duty.
- Use fruit or protein snacks for pick-me-ups at odd duty times.
- Substitute low-fat milk or fruit juice for coffee and soft drinks.

And speaking of coffee, I used to fly with a guy who drank gallons of coffee and never could stay awake. Turned out that he suffered from caffeine toxicity, a not uncommon problem that can cause poor sleeping, nervousness, headaches, and lethargy.

Coffee, tea, and cola, in moderate amounts, promote quick energy and clear thinking through the stimulant effect of caffeine. Above a certain level, caffeine ceases to be beneficial and becomes a hindrance to normal functioning. One cup of coffee or tea contains about 100 mg of caffeine. Twelve ounces of cola contain about 50 mg. Some doctors feel that 500 mg per day is enough, 750 mg is questionable, and 1,000 mg addictive.

Check your caffeine intake and be sure to include all the possible sources. Coffee, tea, and cola are obvious contributors, but caffeine is also present in chocolate and in many of the nonprescription headache and cold medicines, and over-the-counter stimulants.

Now about those cigarettes. One smoke raises the carbon monoxide in the blood to a level that equates to a state of hypoxia at 7,000 feet. Two cigarettes smoked consecutively raise the level to 10,000 feet, and these levels are further aggravated by actual cabin altitude. Smoking is unquestionably a contributor to fatigue.

When you do get drowsy in flight, try a few exercises, eat some nuts, and try to recall the thrilling contents of this column. If that doesn't keep you awake, nothing will.

Bruce J. Kilian
Akron, OH

THIS AVIATOR recently conducted an instrument flight rules (IFR) flight in a civilian fixed wing aircraft. It was a training mission with a student-instructor pilot situation – a routine training mission that ended up being a pretty unique learning experience, to say the least.

Planning for the flight started out, like all IFR flights, with a weather briefing. We were fortunate to have a flight service station at our point of departure so we asked for and received an extremely complete and thorough briefing. The weather all along the route seemed to be solid IFR, with the freezing level reported and forecast to be at least 7,500 feet. We filed and subsequently received clearance to cruise at 5,000 feet.

After takeoff we climbed to altitude and proceeded to our destination. Everything seemed uneventful for the first three-fourths of the trip. Then we started picking up light icing on the leading edge of both wings. We reported such to the controller and we were immediately cleared down to 3,000 feet. During the descent the ice buildup became progressively worse. We checked the pitot heater and found that it was still on and functioning. Leveling off at 3,000 feet the ice was worse rather than better. We again reported such to air traffic control (ATC) and were cleared further down to 2,000 feet which was the minimum enroute altitude for our particular segment. As we leveled off at 2,000 feet, the ice buildup began to taper off and appeared to begin to dissipate. Suddenly, from cruise at 2,000 feet the aircraft gradually began a descent which resulted in 1,000 to 1,500 feet per minute. We started increasing power to cut the descent but it had no visible effect. Airspeed was back to 80 knots with full power and still the aircraft appeared to be descending uncontrollably. The altitude was becoming dangerously low.

Just as we were calling ATC to inform them of the emergency, the altimeter flipped back to 2,000 feet and the airspeed indicator back to cruise. We immediately analyzed the problem as icing of the pitot-static system and went to the alternate static source. We continued cruise at 2,000 feet and received clearance for the approach. The ice still constituted a significant hazard due to the added weight which increased lift and thrust requirments and added drag. The aircraft usually needed 13 inches of manifold pressure to maintain approach speed. During the instrument landing system (ILS) approach we needed 19 inches to hold the same airspeed.

We had to descend completely down to the approach minimums before making visual contact with the runway. The approach was successfully completed, however, and we landed without incident. Still, the trip turned out to be a fairly unnerving experience.

The reason I've related this incident is to stress the dangers of aircraft icing. This was my first experience with icing. Like many Army aviators, my flight experience is limited mostly to visual flight rules (VFR) in Southeast Asia and Southeast United States. Until this incident, I hadn't given much thought to aircraft icing. I also must admit that my knowledge of the problem and its alternatives was sadly deficient.

Since the incident I read up a bit on icing and would like to share some of these facts with you. If I merely put the seed of curiosity in some of your minds I will consider the article successful. Much of the succeeding information was taken from the TM 1-270; TM 1-300; AIMS, Part I; and the UH-1 -10.

First, consider the different types of icings:

Clear Ice – A glossy, clear or translucent ice formed by the relatively slow freezing of large supercooled water droplets. Clear icing usually occurs in cumuloform clouds when temperature is be-

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Detachment 9, 5th Weather Squadron, U.S. Air Force recommends that the first "checklist" item on page 16 could have the following subitems to be emphasized in the weather briefing:

- Areas of reported and/or probable icing, including horizontal and vertical extents.
- Position and movement of low pressure systems, fronts and precipitation areas.
- The windward sides of mountains, hills, as well as other areas of upslope air movement.
- The temperature pattern at altitudes both above and below the proposed flight altitude.
- Complete review of the terrain elevation along the route and where the freezing level intersects the terrain.
- Inflight contacts with agencies capable of providing current weather information, particularly pilot weather reports.

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tween 0 degrees Centrigrade (C) and -10 degrees C, or in areas of freezing rain associated with warm frontal systems. Clear ice is the most dangerous form of structual ice because it clings tenaciously to the airfoil surface.

Rime Ice — A rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets. Rime ice tends to form in stratiform clouds when the temperature is 0 degrees C to -20 degrees C, or in cumuloform clouds when the temperature is -10 degrees C to -20 degrees C. Keep in mind that most ice formations are a combination of clear and rime.

Frost – Composed of ice crystals and formed by sublimation when water vapor contacts a cold surface. Frost is underestimated severely. If it is left on an aircraft during takeoff, the small crystals act as sublimation nuclei and may grow to serious proportions during takeoff or climbout.

Two factors are needed before ice will form – free air temperature at or near the limits described above, and visible liquid moisture (clouds or freezing rain). One gauge that could have helped our situation tremendously would have been a free air temperature gauge. Without this gauge you are completely dependent on weather forecasts and reports for the exact freezing level. This is an excellent gauge but also you must be aware of its deficiencies and limitations. Free air temperature gauges are influenced by radiation, air pressure and friction which may cause the reading to be at least 5 degrees warmer or colder than the true temperature.

In addition to the conditions needed for ice to form there are certain factors that influence the rate of formation. They are:

Drop size – Droplets in the air tend to move with the deflected airstream. The smaller the drops the greater their tendency to follow the airstream. The larger the drops the more they resist the deflected influence. Therefore, large drops collect on a wing easily; small drops less easily.

Airspeed – The rate of ice formation is increased as airspeed increases. However, at very high airspeeds such as those attained by high performance jet aircraft, the situation is reversed due to the heat generated by friction. Icing is seldom a problem at or above 575 knots.

Smoothness of airfoil – After initial accumulation, the airfoil is aerodynamically unclean and presents a larger surface to collect freezing droplets.

The formation process of carburetor ice is quite different from that of structural ice. Carburetor ice may form under conditions where it is impossible for structural ice to form. If the humidity is high, carburetor ice may occur in clear air when the temperature is as high as 25 degrees C and is most serious when temperature and dewpoint approach 20 degrees C. Carburetor ice is the result of two separate cooling processes during carburetion:

Vaporization of gasoline – causing the greatest temperature drop.

Decrease in pressure in the venturi tube.

It makes sense to understand what causes carburetor ice and to use your carburetor heat liberally when in the critical temperature range.

Most of the information you receive on aircraft structural icing pertains to fixed wing aircraft. However, since in the Army today we are flying mainly turbine powered helicopters, let us deal with them for a while.

Ice formations on rotor systems may produce critical vibrations and loss of efficiency or control. The rotational speed of the tail rotor produces a rapid accretion rate. The helicopter has some built-in factors which tend to reduce the ice accretion rate. They are:

- The centrifugal force of rotation
- Bending and flapping of blades during rotation tion
- Slow rotational speed of blades near the hub
- Fast rotational speed of blades near tips

However, at a hover, a 3/16-inch coating of ice on the main rotor blades is sufficient to prevent some helicopters from hovering. The critical icing hazard can therefore form rapidly on the center two-thirds of the main rotor blades and the uneven accretion or shedding critically magnifies the vibrations.

Turbojet engines with axial flow compressor blades are affected by the same conditions which cause airframe icing. Ice on the inlet guide vanes restricts the airflow through the compressor section. The situation results in reduced thrust, excessive exhaust gas temperature and probably turbine failure. The rate of accretion is different. However, the amount of engine icing depends on the concentration of water and is almost independent of the size

of the water drops. Objects which protrude into the airstream with a small radius of curvature (antennas and pitot tube braces) provide the most reliable visual indication of the rate of engine icing. A low airspeed will reduce the rate of ice formation in both engine and airframe. However, the aviator should maintain a close watch on the exhaust gas temperature when icing is suspected.

Icing of the engine air inlet screens can be expected when operating at an outside air temperature (OAT) of 40 degrees or below. Attention is called at this point to change 13, page 10-10, paragraph 10-39b to the UH-1, -10 operator's manual which recommends that when the helicopter is to be flown under atmospheric conditions conducive to icing the right and left engine air inlet filters be removed from the cowling to preclude the possibility of icing. Paragraph 10-39b also states that "intentional flight in known icing conditions is prohibited."

The following is a general checklist to help you the aviator avoid a critical icing situation:

- Check the weather carefully. Ask the aviator who just came through.
- Check notices to airmen (NOTAMs).
- Remove frost and snow before takeoff.
- Check controls for restriction of movement.
- Wear sunglasses if glare is bad.
- Use pitot heater and carburetor heat when entering respective icing conditions.
- Do not stare through a canopy, windshield or chin bubble on which ice is forming. A loss of sense of direction and movement may result.
- If icing becomes a problem go to the altitude where the temperature is above freezing. Remember that the warmer temperature is not always the lower altitude. The presence of frontal inversions and their respective altitudes should be included in the preflight weather briefing.
- Have aircraft equipped with an outside air temperature gauge and be aware of its limitations.
- Report all inflight weather hazards.
- If icing cannot be avoided, choose the altitude at which icing is likely to be least severe.
- Before takeoff ensure that antiicing and deicing equipment is in operating condition.
- When ice is formed the increased drag requires more fuel to reach destination.

Icing tips that pertain to helicopters are:

- Indications are ice on the chin bubble (ice is slow to build up on heated cockpit windshields); mushy cyclic control; excessive vibration; and loss of revolutions per minute as ice builds up.
- Do not attempt to throw ice off blades by sudden rotor acceleration or rapid control movements. Only a small portion of ice would be thrown off resulting in a severe out of balance condition.
- Ice may build up rapidly on a rotor system operating at low rotor rpm (parked helicopter at idle). When these conditions are suspected the aviator should shut down and inspect the blades before takeoff.

Icing tips pertaining to fixed wing are:

- Taxi slowly and use brakes with caution.
- After runup in fog or rain check wing and empennage for ice in prop wash area.
- Avoid taking off in slush or wet snow.
- Watch airspeed. Stalling speed increases with frame icing.
- Check wing deicers and use them properly. Do not land with deicers on since they act as airflow spoilers.
- Avoid steep turns with heavy coating of ice.
- Before starting a landing approach, make sure the carburetor butterfly valve is clear of ice.
- One-half inch of ice on the leading edge of some aircraft will reduce lift 50 percent and increase drag proportionately.

To conclude I would like to cite a portion of AR 95-1, "Army aircraft will not be flown into known or forecast severe icing conditions. If a flight is to be made into known or forecast moderate icing conditions, the aircraft must be equipped with adequate deicing or antiicing equipment."

Certainly this is worth remembering!

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OPMS CORNER

Officer Personnel Management System

Major Richard Parris
Aviation Assignment Majors Division
Officer Personnel Management Directorate

"...and, you won't be a captain forever"

THE OFFICER PERSONNEL Management System (OPMS) is alive and well in the Army today, and will continue to be the basis for managing the Army officer corps. It is important to begin with that qualification because OPMS is here to stay.

This article is directed primarily at today's captains—tomorrow's majors—who are Army aviators with a primary or alternate specialty of 15, particularly captains with basic year groups of 1970 and earlier. Aviators with later year groups have been managed by the company grade career management divisions to preclude most pitfalls I will describe. The intent of this writing is to relate, from my view, a few of the predicaments company grade aviators get into, and some alternatives that may prevent dilemmas later. The picture I paint may be fact for you tomorrow; it is reality today for many officers managed by Majors Division.

Consider these points: *First*, the time you will spend in grade as a major isn't nearly as long as the time spent as a first lieutenant and captain. Today's majors are averaging 16 years active federal commissioned service before promotion to lieutenant colonel. If you are promoted between your 10th and 11th year of commissioned service, you can look forward to spending between 5 and 6 years as a major, instead of the 11 years spent in the company grades. This means that Majors Division will get to assign you once, or maybe twice—seldom, if ever, more than that. At that point, you are either a promotable major or nonselected for promotion to lieutenant colonel.

Second, the Aviation Career Incentive Act (ACIA) of 1974 dictates that an aviator must accumulate 72 months of aviation duty in the first 12 years of aviation service (computed from the first day of flight school) in order to make the 12-year "gate" and remain eligible for continuous flight pay to the 18th year. For most officers that 12-year mark will come while serving as a major. Additionally, many captains find it mathematically impossible to attain the 72 months required for the first "gate" *after* getting promoted to major.

Third, not being qualified in two specialties may affect selection for schooling or promotion. And remember, how well one functions in each assignment is the key factor that determines the outcome of promotion and selection boards.

Fourth, assignment priorities and Army requirements in the field grade career management divisions are very different from priorities you now experience in the company grades. Most lieutenants and captains are assigned to duties directly related to either the entry specialty (your branch) before attending flight school and then to an aviation assignment for a utilization tour following initial schooling at the U.S. Army Aviation Center, Fort Rucker, AL.

The high rate of company grade utilization in the aviation specialty and corresponding low utilization in the field grades is seen easily by comparing the numbers of lieutenants and captains required in an aviation battalion with the number of majors required in the same unit. Conversely, the number of majors working as staff officers at division, corps, Army and in joint headquarters far outweigh similar requirements for company grade officers. In this regard, aviators are no different from field grade officers of other specialties, especially in the combat arms.

Finally, for planning purposes, we must consider the time available for professional development at the 04 level such as staff college, civil schooling, etc. What does this mean? Let's look at the file of a hypothetical officer, Captain (P) Hummer, who will be promoted to major next month.

Captain Hummer spent his first 2 years as a platoon leader and assistant S-4 in an Armor battalion. His entry specialty was 12, Armor. His third year was spent at Fort Rucker in flight school, and he was awarded an alternate specialty of 15. His fourth through seventh years were in an aviation as-

signment on his utilization tour. His eighth year was partially devoted to his branch advanced course and, upon completion, was awarded a primary specialty of 15 and an alternate specialty of 92 (Supply Management). The requirements of the Army, and the aviation experience and desires of the individual dictated the specialty combination.

Captain Hummer was then assigned to Germany. During the tour in Europe several assignment opportunities presented themselves: utilization as an aviator (the primary specialty), an S-4 or assistant G-4 (his alternate specialty), or as a tanker (the entry specialty). What choices did he make? What assignments did he seek? Where did the commander utilize this officer?

Initially, Captain Hummer will probably be assigned to work in the specialty – control specialty – that he was requisitioned against and probably will have little choice in that assignment. As he progresses in Europe, establishes a professional reputation, and approaches the end of his initial job, other assignment opportunities become available. Here, Captain Hummer should first read DA Pam 600-3, then seek advice from his commander, the personnel officers in the S-1/G-1 channels, and his assignment and professional development officers at Military Personnel Center (MILPERCEN).

When being reassigned, either in the field or moved to another duty station by MILPERCEN, remember that there are some Army requirements that do not align under any specific specialty. These jobs are important to the Army mission and need quality officers to fill them.

If selected to work outside your specialties, also give the job your best professional shot. We do not place officers in duty assignment outside their specialties, any more than necessary to accomplish the Army mission. When jobs are offered or sought remember the points mentioned earlier that will impact on specialty development in a few years.

As Captain (P) Hummer returned from Europe, now to be assigned for the first time as a major, these are the foremost considerations.

- He will be a major for approximately 5 years.
- Has he made his 12-year "gate"?
- Is he qualified in his alternate specialty?
- Will he attend Command and General Staff College (CGSC) during one of these years?

Now we must bounce those questions peculiar to Captain (P) Hummer against the Army requirements. Our assignment priorities are *not* to send him to the Continental United States (CONUS)-based divisions, but rather to Reserve Officers Training Corps (ROTC) or the U. S. Military Academy; to an assistant inspector general or to the Recruiting Command; as an advisor in an Army Readiness Region; or to the Pentagon. He may even draw a tour with another service. Most of these jobs (except in the Readiness Regions) are non-flying billets. A major, by definition, is primarily a staff officer.

Where's the dilemma I mentioned earlier? Major Hummer may only have one or two assignments by us. The requirements of the ACIA, specialty professional development, and time in grade as a major to accomplish these things, are in conflict. There is just not enough time to do them *all* as a major. Some requirements *must* be satisfied as a captain.

We have requirements to aid in utilization of aviators, once that specialty is awarded, but remember that Army requirements take priority. We seek to develop officers in two specialties and you should pursue such a course when you submit your assignment preferences. All the answers are not definitive – much is left to good judgment, planning and common sense. In trying to figure it all out, consider:

- Commissioned aviators in year group 71 and later normally are not affected by the pitfalls – utilization rates and intensive management have precluded most problems.
- Read DA Pam 600-3 and realize that the days of officer "generalization" are now over. OPMS intends to develop your expertise in two areas – your primary and alternate specialties.
- Talk to the officers in the assignment divisions in MILPERCEN. It is our job to answer questions and provide guidance.
- When you are awarded primary and alternate specialties, strive to develop yourself in those areas when opportunities permit. It is in these areas that you will primarily be considered for schooling and promotion.
- Understand that Army requirements will supersede all else in determining your assignment, but when the opportunity arises to seek a job, and you have a choice – "you" are the best and most effective career manager – if you understand the Officer Personnel Management System.
- Remember that OPMS is in good health, and will have a long life ahead. If you don't understand how this system works or you find yourself following the advice of those who don't understand the system either – you might consider changing course. You won't be a captain forever.

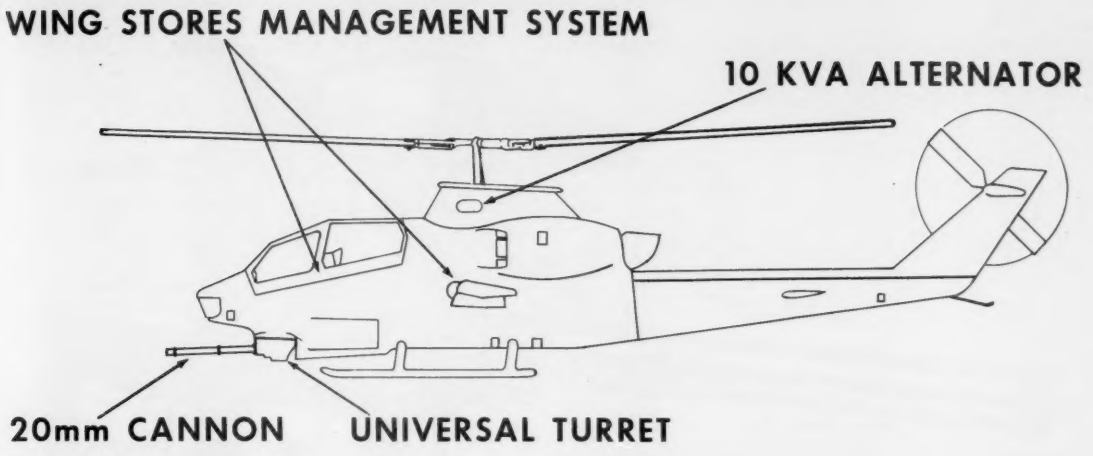


Figure 1—Production upgunned AH-1S features

MODERNIZED COBRA PART 2

Colonel Robert P. St. Louis Project Manager, Cobra, TSARCOM
St. Louis, MO

LAST MONTH part one of this article presented an overview of the AH-1 Modernization Program. It focused on the features of product improvements and how the resultant improvements will be incorporated into the Cobra TOW (tube-launched, optically-tracked, wire-guided missile) antiarmor attack helicopter fleet.

This article addresses, in part, the new weapon subsystems which will increase significantly the combat capability of Cobra TOW attack helicopters.

The requirement to modernize and "upgun" the Cobra was defined by a Special Study Group (SSG) during the Priority Aircraft Subsystem Review at Ft. Rucker, AL from November 1974 to December 1975. (See "Pass in Review," April 75 *DIGEST* and "The Upgun Dilemma," May 75 *DIGEST*.)

The SSG, under the direction of the commanders of the U. S. Army Armor and U. S. Army Aviation Centers, was comprised of representatives of TRADOC (Training and Doctrine Command), DACROM (Army Materiel Development and Readiness Command), subordinate commands, the Cobra Project Manager's Office and field commands. Following affordability analyses of the SSG recommendations by the Department of the Army staff, Required Operational Capability (ROC) documents were approved and used as the basis for structuring the current Cobra Modernization Program.

The first major effort to upgun the Cobra attack helicopter was included in the Enhanced Cobra Armament Program (ECAP). Bell Helicopter Textron (BHT) is the prime contractor and system integrator. The program is divided into two phases to best meet the funding and development time frames.

Phase I includes development and qualification of a universal turret to accommodate either the 20 mm or 30 mm weapon system and a Stores Management/Remote Set Fuzing Subsystem. It also will include aircraft interface aspects and the application of additional fiscal year (FY) 78 product improvement programs (PIPs).

Phase II includes the qualification of a new fire control subsystem, the incorporation of additional PIPs and improvements in aircraft survivability equipment. Phase II will be discussed next month in part 3 of this article. Figure 1 summarizes the basic features of the ECAP Phase I Program.

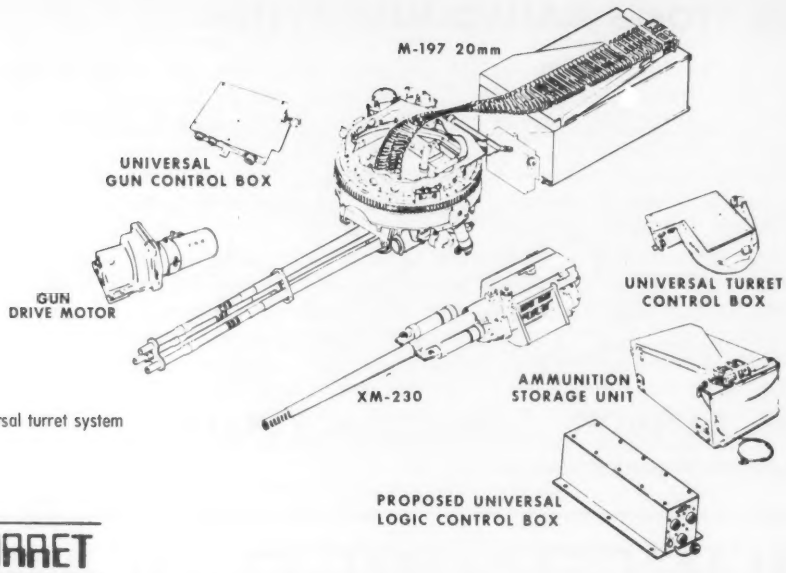


Figure 2— Universal turret system

UNIVERSAL TURRET

The universal turret will be developed and manufactured by General Electric, Armament Systems Department, Burlington, VT. The objectives of the Universal Turret Program are to provide an improved standoff capability, improve antipersonnel and antimateriel effectiveness and accommodate either a 20 mm or 30 mm weapon. This new turret eventually will replace the M28 (7.62 mm/40 mm) subsystem now installed in the Cobra.

The 101st new production AH-1S is scheduled for delivery this September. It will be equipped with the universal turret and the 20 mm, M197 gun. The 30 mm, XM230E1 gun is scheduled for installation on the AH-1S in May 1981. The Universal Turret is electrically powered and has a design weight limit of 175 pounds. The basic components of the system (figure 2) are the turret, linked feed system and three electronics boxes containing the turret, gun and logic controls.

In the AH-1S, the Universal Turret fires through ±110 degrees forward azimuth and has a variable elevation of 20.5 degrees maximum and a depression of 50 degrees maximum. Turret position is controlled by the pilot or copilot through helmet sights or by the copilot through use of the Telescopic Sight Unit (TSU) of the missile subsystem. The turret is electrically driven by two servo motors—one for azimuth and one for elevation. The motors receive position commands from either the TSU or helmet sights and feature quick response and safe, reliable operation.

As previously indicated, the universal turret will accommodate either the 20 mm M197 Vulcan or the XM230E1 Chain Gun. The saddle of the turret is designed to accommodate the slide mounts of the XM230E1 and the quick release pin mounting of the M197. The ammunition storage container is designed to hold either 20 mm or 30 mm ammunition. Partitions will be added to the container to accommodate the shorter 20 mm round. Ammunition chuting is easily exchanged by using quick release fasteners. The complete operation of interchanging gun, chuting and feed systems takes less than 30 minutes.

The M197 20 mm gun is shown in figure 3 mounted on the universal turret with its ammunition container. It fires standard M50 series 20 mm ammunition at a rate of 730 ±50 shots-per-minute with an effective range of 2,000 meters. For the AH-1S, the gun is held within the turret by a rear ball mount, a slider, and a low force recoil adapter. The low force recoil adapter reduces the recurring peak recoil load of the gun to about 1,150 pounds.

The XM230E1 30 mm Chain Gun is shown in figure 4 mounted on the Universal Turret with its ammunition containers. This weapon fires the XM-788789 (ADENDEFA) family of 30 mm ammunition (figures 5 and 6) at a rate of 730 ±50 shots-per-minute and has an effective range of 3,000 meters. The recoil attenuating system, supplied as a part of the turret subsystem, will limit 30 mm gun recoil forces transmitted to the turret and provide compatibility with the TSU.

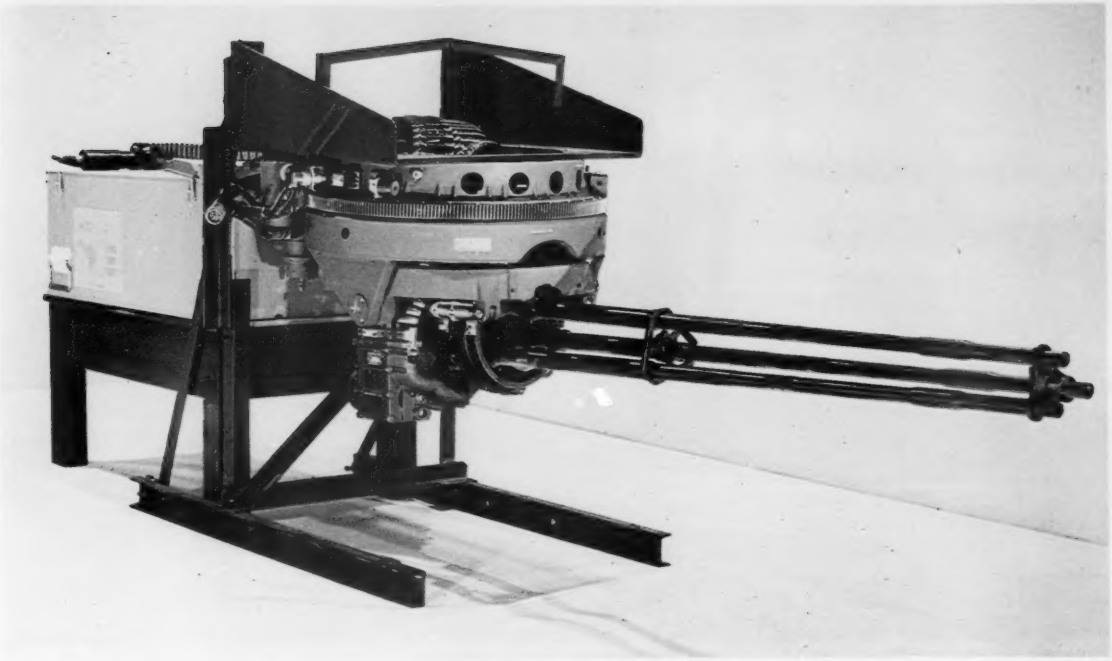


Figure 3—M197, 20 mm gun with ammunition container mounted in universal turret

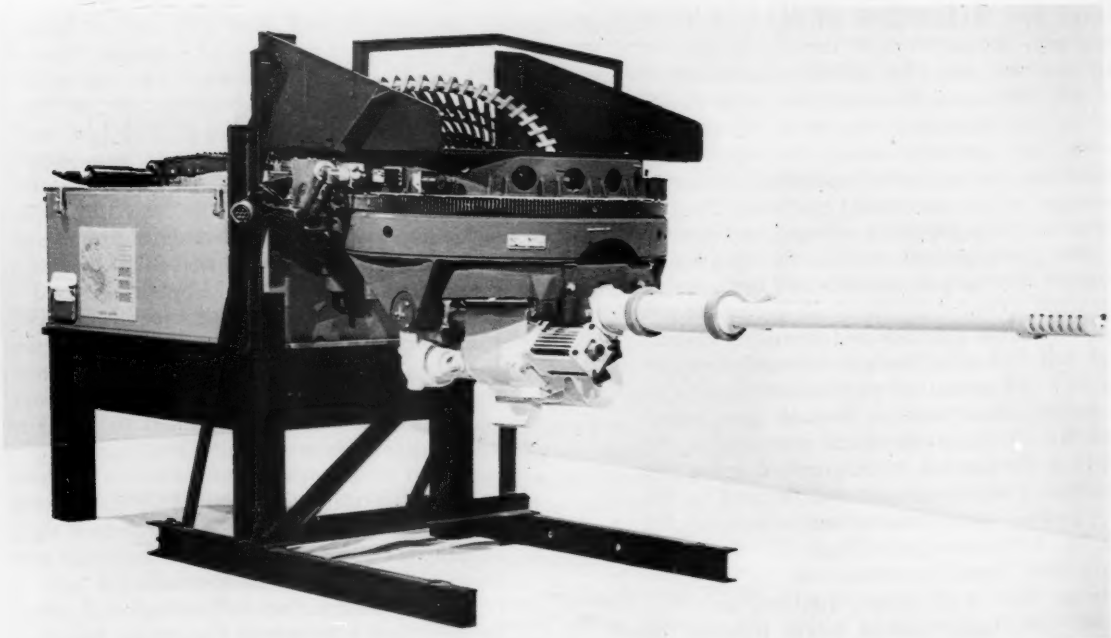


Figure 4—XM230E1, 30 mm chain gun with ammunition container mounted in universal turret

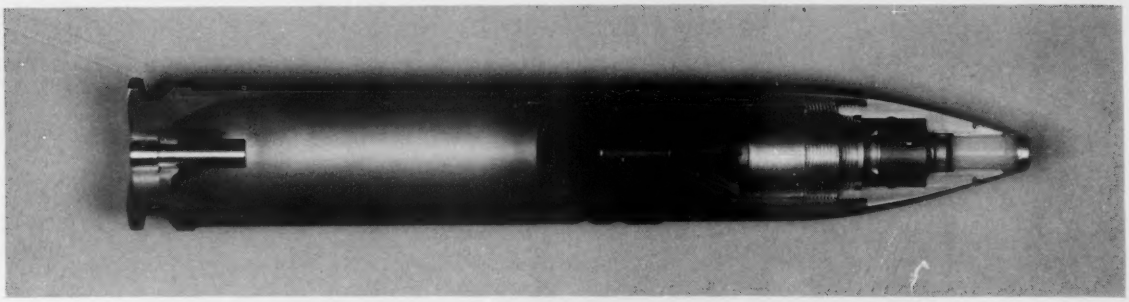


Figure 5—30 mm ADEN/DEFA type ammunition to be utilized in the XM230E1 chain gun (XM789)

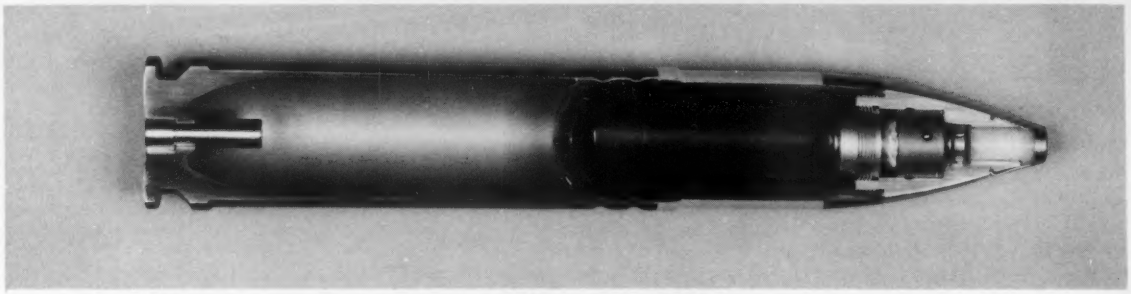


Figure 6—30 mm ADEN/DEFA type ammunition to be utilized in the XM230E1 chain gun (XM799)

TURRET AND CONTROLS

On the AH-1S, the turret is mounted under the nose of the helicopter, the same as the present M28 turret. The turret contains the components necessary for positioning and firing the gun as directed by the gunner from the sighting station. Positioning of the gun is performed by a gimbal and a saddle which moves the gun in azimuth and elevation respectively. The azimuth and elevation drives are powered by direct current motors through gear reductions. Electrical current for the motors is controlled from the servo amplifiers, located in the turret control box, which use the helicopter's 28 volt DC (direct current) power source.

The turret, gun and universal logic control boxes provide the electronics for all controls and switches in the system.

20 MM/30 MM LINKED STORAGE AND FEED SYSTEM

A complement of 750 20 mm or 500 30 mm rounds of linked ammunition is fed to the gun through flexible chuting from the ammunition box stored in the ammunition compartment of the helicopter. During firing, a small booster motor pulls linked ammunition from the box and pushes it into a section of flexible chuting which is connected to the gun's feeder. The booster eliminates excessive belt pull loads, which occur when the belt is pulled on by the delinking feeder, and eliminates the requirement to manually fill the chute during loading.

2.75 INCH ROCKETS

The 2.75 inch rocket subsystem has been one of the primary aerial weapon systems used on the Cobra. It provided valuable support to ground units during the Vietnam conflict.

There are several development programs that have been initiated by the 2.75 Inch Rocket Project Manager to improve the warheads and launchers to be used on the modernized Cobra. The basic 2.75 inch rocket motor and the available warheads are shown in figure 7. The submunitions and chaff warheads are the newest developments in the warhead program.

During the SSG review in 1974-5, the weight of any prospective improvement was a key consideration in structuring the modernized Cobra program. As a result of the weight factor, a requirement for lightweight 7 and 19 round launcher development was established. The design features of these launchers are illustrated in figures 8 and 9.

The Stores Management/Remote Set Fuzing Subsystem developed and manufactured by Baldwin Electronics Incorporated, Little Rock, AR, will use the 2.75 inch warhead and launcher improvements to enable more effective mission accomplishment by Cobra crews. This subsystem is scheduled to be installed on the 101st new production AH-1S in September.

The control panel for the stores management/remote set fuzing subsystem is shown in figure 10. The panel will provide the means to select and fire, while in flight, any one of five types of external rocket stores. It will allow the pilot to set range and select the fuze setting best suited to the type target being engaged to include settings which will permit penetration of tree canopies or fortifications protecting selected targets.

Although electrical power requirements for the AH-1S continue to increase, adequate power will be available to operate subsystem changes described in this article, plus several high electric power demand devices forthcoming.

Beginning in September 1978, modifications will include the installation of alternating current alternators on the transmissions of all Cobra S models produced.

The weapon subsystems discussed above, coupled with the TOW missile, and the versatility of available ordnance will provide Cobra crews with the required firepower to accomplish missions of antiarmor, direct aerial fire support and armed escort/reconnaissance. The commonality of guns, rockets and missiles will enhance the effectiveness of rearming at forward area rearm and refuel points (FARRPs). The survivability of the crews will be improved greatly with the added standoff capability; the accuracy and effectiveness of the new weapons and ammunition; plus the capability to remotely select the correct fuze setting for the type target being engaged. The enhanced armament subsystems on the modernized AH-1S will keep the attack helicopter a viable member of the Army's combined arms team for many years.

Next month part 3 of the "Modernized Cobra" will cover the fire control, aircraft survivability equipment, laser rangefinder, and the laser tracker programs.

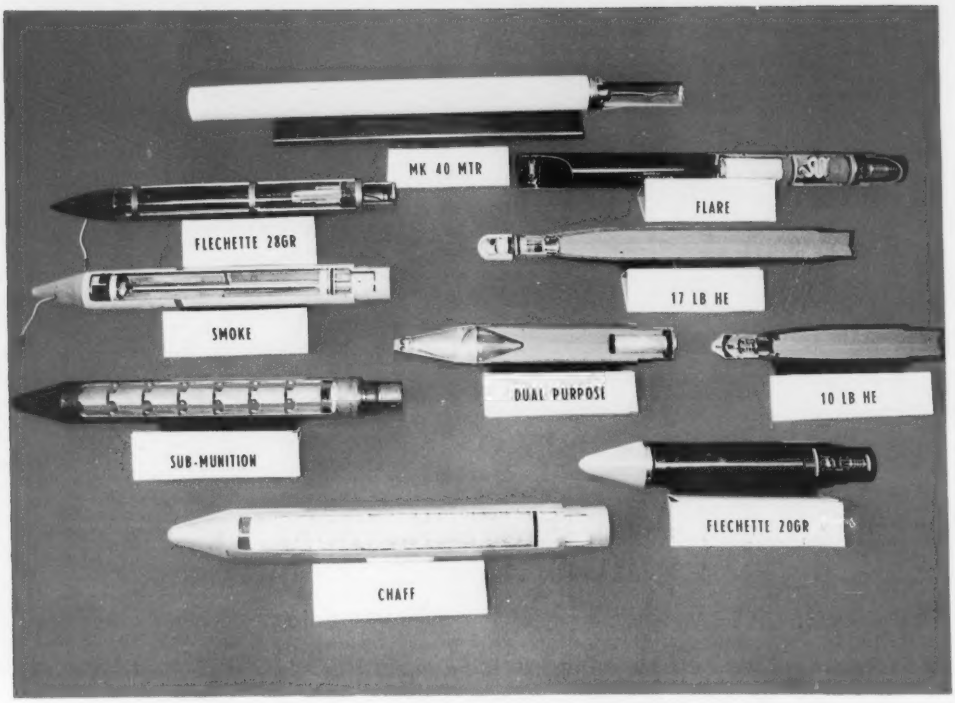


Figure 7—2.75 inch rocket motor and warheads

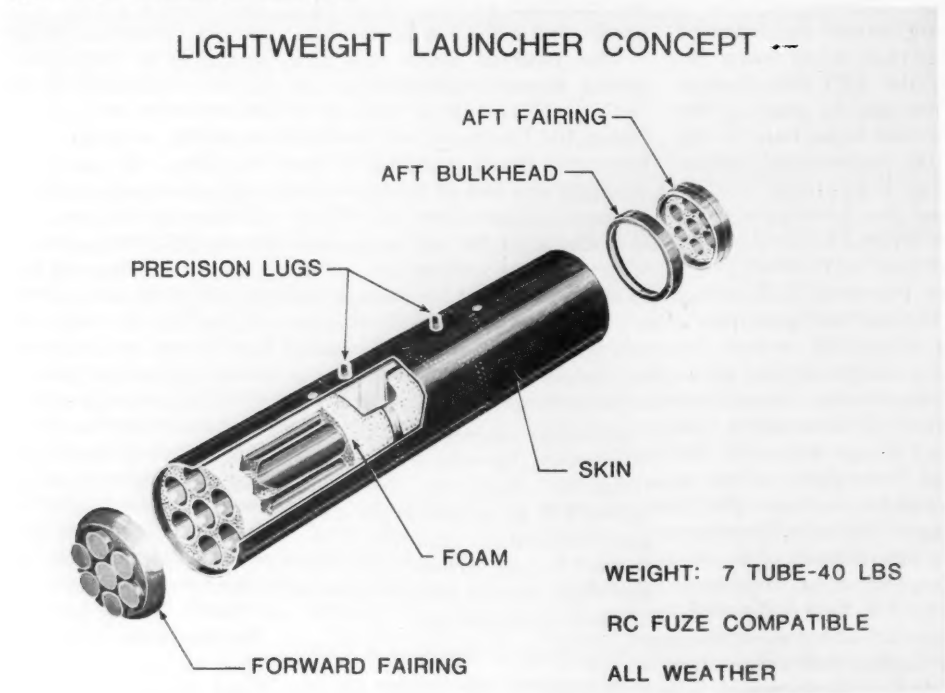


Figure 8—7 round 2.75 inch rocket lightweight launcher

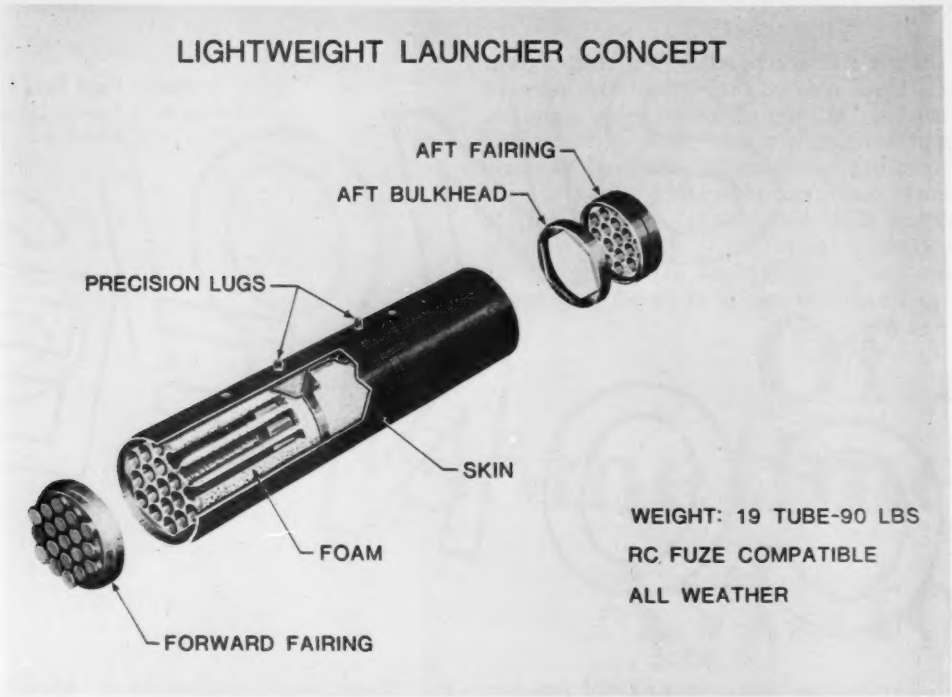


Figure 9—19 round 2.75 inch rocket lightweight launcher

Figure 10—Control panel for stores management and remote set fuzing subsystem

CONFES

Major Paul Brennan
Directorate of Training Developments
Ft. Rucker, AL

MY APPREHENSION started almost a year ago when I was notified that I would be assigned to Ft. Rucker, AL, the *Home of Army Aviation.* What apprehension, you ask? Well, it is a sort of pulse elevating, perspiration starting, physical and mental condition associated with the term "operational flight assignment" – known only to the sometimes aviator.

Permit me to digress and explain my Army career so I can clue you in as to why my hands now are shaking.

I was commissioned in the summer of 1966 but did not attend flight school until the summer of 1968. Two years of ground duty in various commands in the Far East prepared me to join the elite – the United States Army's aviators.

I was notified in March 1968 that I would attend the Officer Fixed Wing Aviator Course 12-68 at Ft. Stewart, GA.

I was graduated from flight school in February 1969 and given an "incountry" date of 11 March 1969 for the Republic of Vietnam (RVN).

Since I was a "qualified" Birddog (0-1) pilot, I soon joined the "Catkillers" of the 220th Aviation Company in Phu Bai, RVN. My year with the 220th was both exciting and rewarding. I was lucky enough to be a platoon leader for the first 6 months and the company operations officer the last 6 months. Just prior to leaving Phu Bai, I learned that I was going to be assigned to Ft. Rucker. This was the first time I had ever noticed the symptoms that I mentioned earlier – those associated with a gut feeling of fear.

The reason for my apprehension was the strong possibility of being used at Ft. Rucker as an 0-1 instructor pilot (IP). Sure enough, just after my arrival at the Aviation Center in 1970, I was sent to the Birddog Tactics Branch for training as an IP. I was convinced that there wasn't any way I could fly that airplane from defilade (the instructor sits in the back) and knew that I would ultimately end up in a padded cell in the local hospital. Well, somehow I made it through the instructor pilot course and eventually went on to actually love that job.

I was later to become a flight commander with the Fixed Wing Tactics Branch until its demise in the summer of 1971. As I look back fondly now, it was undoubtedly the best job I have ever had in Army aviation.

When I left Ft. Rucker in the summer of '71, I was to embark on a 6-year stretch of being the "sometimes aviator." I attended the Field Artillery Officers Advanced Course at Ft. Sill, OK from October 1971 until August 1972 and was prohibited from flying. In September 1972, I was assigned to Ft. Dix, NJ, and assumed command of a basic training company. I became a "Category B" aviator for the next 3 years. Category B aviator was synonymous with "barely" – barely able to get off the ground, barely able to hold the wings level, and barely able to find your homefield if you got more than 50 miles away.

When the "Category Bs" showed up at the flight detachment, the "real aviators" would kind of snicker and generally treat us as second-class citizens. Now, I for one was certainly not able to land my airplane on a famous cereal company's box top every time, but I could find homeplate.

After 3 years of maintaining minimums, I was selected to go on an unaccompanied tour with the Field Artillery in Turkey; a definite ground assignment with absolutely no possibility of flying. I

SSIONS Of A Sometimes Aviator

put aviation in the back of my mind and concentrated on being a good Field Artilleryman.

After surviving a tour as a commander of an isolated Artillery detachment in the remote mountains of Turkey, I was thrilled when my copy of Department of the Army's (DA) Request for Orders indicated that after 6 months of civilian schooling, I would again return to the *Home of Army Aviation*, Ft. Rucker.

I think this was when I again noticed those pangs of apprehension. I put them to the back of my mind and prepared to become a civilian student.

As I completed my civilian schooling, I turned my attention to rejoining the Army and my upcoming tour at Ft. Rucker. Once again my palms were sweating and my heart was racing. What was causing all this? Could it be that after a 6-year break from flying regularly, I had lost my nerve? Was the once "devil may care" Army aviator who single-handedly could fly an 0-1 around the world on 2 gallons of gas suddenly reduced to a sniveling chicken hearted bundle of nerves? No–No–Never!

When I arrived at Ft. Rucker and processed, the flight line became more ominous. During my first few days at the Aviation Center, I had to turn my records in at Cairns Army Airfield and be interviewed about my proficiency level. As I entered the Instrument Aviator Qualification Office (IAQO) it became crystal clear that my time had come. I felt as intimidated as I was the first day of flight school.

A senior CW4, who smiled gently once in 1958, reviewed my records. Making notes as we went, I heard the man say, "Instrument ticket expired."

"T-41 IP. Hmmmm" he said.

"0-1 IP. Hmmmm" he said.

"Ah! T-42 qualified. Eureka! There is an airplane left in the inventory for you to fly."

"You don't fly helicopters, Major–do you?" he asked.

I said with all my courage, "No, sir!" Needless to say, I was going to be a hard case–better call on the "master."

My IP was a DA civilian with more than 20 years experience, who realized how much I had forgotten when on the first day of my checkout, in the T-42, I inadvertently prepared to preflight a U-8.

The bottom line of this anecdote is that after a few hours not only did my confidence return; but, also I actually felt comfortable. The professional competence of my instructor, coupled with a lot of midnight studying and preparation, resulted in my completing my currency ride and, after a few more flights, renewing my instrument qualification.

So, take heart you sometimes aviators, when your turn comes to stand before the "big W4" at Ft. Rucker. It's not all that bad–in fact, it is really fun.

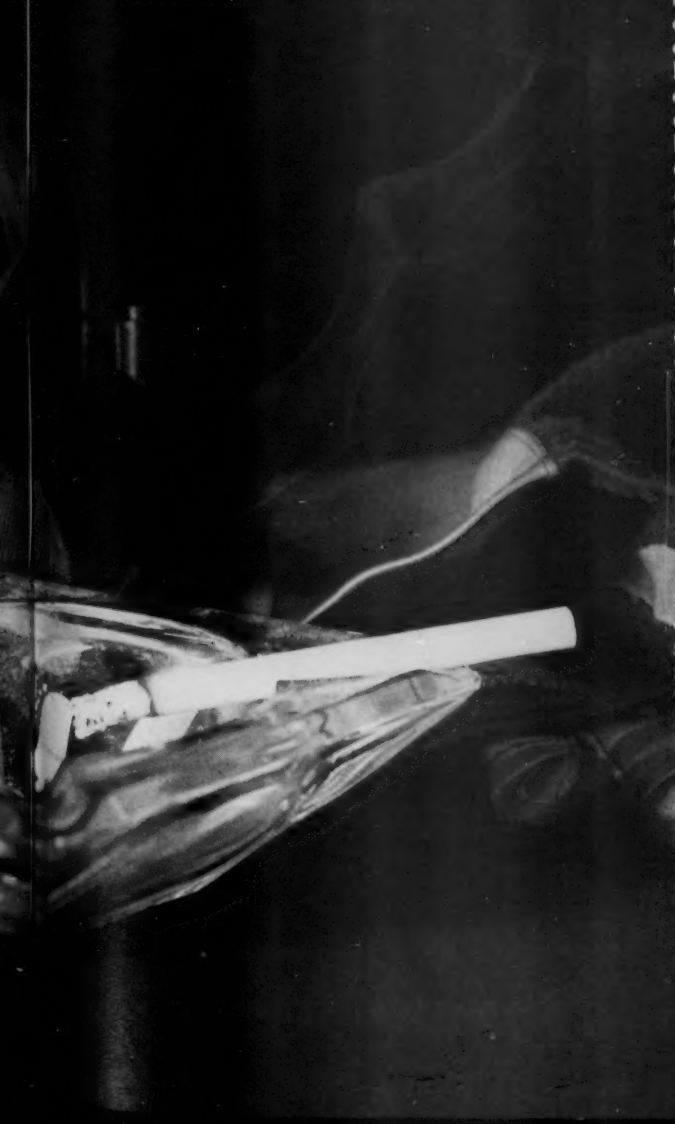
COL Frank S. Pettyjohn, M.D., F.A.C.C.
MAJ Joseph C. Denniston, V.M.D., Ph. D.
CPT James K. Boyter, M.S.
U.S. Army Aeromedical Research Laboratory
Fort Rucker

CARBON MONOXIDE AND THE AVIATOR

(Or-What altitude did you reach from one cigarette?)

INTRODUCTION

The continued controversy concerning the importance of carbon monoxide (CO) effects on health and performance easily lulls one into underestimating the seriousness of the problem. The following review is presented in order to put carbon monoxide in correct perspective for the aviation community and in the interest of aviation safety.



DISCUSSION

Carbon monoxide is a colorless, odorless, and nonirritating gas that is generated by incomplete combustion. Its production is associated most commonly with industry, vehicular and aircraft engine exhausts, and smoking. The physical effects on man and decrements in performance associated with carbon monoxide are related, in part, to its combination with hemoglobin (Hb), the oxygen carrying component of blood, to form a compound known as carboxyhemoglobin (COHb). The combination of hemoglobin and oxygen forms oxyhemoglobin. It is essential that a few facts be reviewed to assist in the discussion of this problem. The affinity of hemoglobin for carbon monoxide is 200-250 times that for oxygen. Increasing COHb levels decreases the amount of oxygen that can be carried to the tissue through the normal physiological mechanisms. Increasing COHb levels also increases the binding of hemoglobin to oxygen whereby the hemoglobin becomes less willing to release the oxygen when it reaches the tissue. The effect of carbon monoxide in decreasing available oxygen through the formation of COHb is, thus, similar to the reduction in Hb saturated with oxygen that occurs with increasing altitude. In both cases, COHb and altitude, the effect is a decreased amount of oxygen carried by the blood to the tissues. Expressed in another way, the change in saturation (percentage of Hb bound with oxygen to the total available Hb) is reduced by both altitude and carbon monoxide inhalation. Their respective effects on vision led to the development of the concept of "equivalent physiologic altitudes."* It was found, for example, that 5% COHb and 95% oxyhemoglobin depressed visual sensitivity to the same degree as a 5% reduction in oxyhemoglobin saturation (5% Hb and 95% oxyhemoglobin). It was, thus, concluded that 5% COHb at ground level depressed visual sensitivity as great as flying at 8,000 feet in altitude.

This early research work indicated that equal decrements in performance were to be expected from equal amounts of oxyhemoglobin desaturation by carbon monoxide or altitude. It should be realized, however, that on a theoretical basis the decrement should be greater with COHb than with altitude. This is apparent from the previous discussion of the effects of carbon monoxide on Hb and the fact that equivalent desaturation with carbon monoxide or

altitude does not result in similar compensatory responses. Of particular importance is that a compensatory increase in ventilation occurs with altitude-induced hypoxia but does not occur with carbon monoxide hypoxia. Recent evidence, however, indicates that the blood flow to the brain increases (supplying, within limits, the necessary needs of the brain) during equivalent exposure to altitude or carbon monoxide.[11] This may account for the similarity of effects on vision by carbon monoxide and altitude.

The signs and symptoms resulting from carbon monoxide inhalation are listed in table 1. The most likely exposure level of aviators would be the 0 to 10% COHb level with no resulting symptoms or signs of illness noted. You the aviator, however, are aware that levels of COHb associated with decrements in function are frequently well below the 10% level. In other words, one could feel just fine and consider all is going well when, in fact, performance may be well below par due to carbon monoxide inhalation.

Measurable impairments in physiological and cognitive function have been demonstrated with increasing COHb levels.[3,4,7,12] Visual acuity is impaired at the 3-4% COHb level. Visual thresholds increase markedly at 4-5% COHb. With a level of 11% COHb, peripheral vision is reduced. Marked deterioration in the ability to detect and distinguish a light has been noted with 5% COHb. Similarly, a reduction in the ability to discriminate auditory signals occurs at less than 2% COHb. Altered choice discrimination and increases in number of errors and completion time are detectable below 5% COHb. Recently a deterioration of safe driving habits has been observed following a 3.5% increase in COHb. Interestingly, the loss of self-criticism and impaired judgment is recognized as early manifestations of decreased oxygen availability to the brain. Importantly, low levels of COHb have been associated with the same significant impairment of vision, hearing and cognitive function.

It is essential that you, as the aviator, recognize the greater risk for decremented function from carbon monoxide occurring by the very nature of your occupation. Levels of COHb that are readily acceptable at ground level may markedly accentuate the effects of altitude at even relatively low carbon monoxide levels. In addition, the airman's occupation is such that his preoccupation with detail by necessity limits his mental reserve and makes him more susceptible to small increases in COHb.

The increase in respiratory volume of the aviator in flight would increase the rate of uptake of ambient levels of carbon monoxide. This would result in a more rapid rise in the COHb level. Other important factors which determine the COHb level are: pulmonary ventilation, ambient carbon monoxide levels, barometric pressure, oxyhemoglobin, arterial oxygen tension, smoking habits, and duration of exposure.

TABLE 1. Clinical signs and symptoms of carbon monoxide poisoning associated with various concentrations of carboxyhemoglobin.*

% Carboxyhemoglobin	Ambient CO** (ppm)	Signs and Symptoms
0-10	0-70	None.
10-20	70-160	Tightness across forehead; slight headache; exertional dyspnea (shortness of breath).
20-30	160-280	Throbbing headache; slight nausea; abnormal fine manual dexterity; giddiness.
30-40	280-440	Severe headache; dizziness; nausea; vomiting; syncope (faintness); dimness of vision.
40-50	440-660	Syncope; collapse.
50-60	660-1000	Convulsions; coma; Cheyne-Stokes respiration.
60-70	1000-1600	Cardiac and respiratory depression; coma; convulsions.
70-80	1600-2900	Cardiac and respiratory failure; death.

*Data summarized from literature (2, 6, 9, 10).
**Lowest values of ambient CO (ppm) calculated to give the corresponding carboxyhemoglobin level.

The aircrewman must be able to relate the ambient carbon monoxide to COHb if he is going to fully appreciate the impact on his performance. Considering the multitude of factors that influence the COHb, it is not surprising that it is difficult to predict the impact of a given ambient carbon monoxide level. If we consider a range of ambient carbon monoxide of 10-50 parts per million (ppm) in cities, the corresponding COHb would be approximately 1.5% to 7.2%. High levels of carbon monoxide will occur in poorly ventilated and congested areas. In fact, carbon monoxide levels as high as 150 ppm have been recorded at an arrival concourse.[5] Thus, one clearly could have existing levels of COHb that are sufficient to impair function. The usual range of COHb for nonsmokers is 1.2 to 2.0%. For smokers the level reaches 3.2 to 6.2% and has occasionally reached 20%.

Smokers with their higher COHb levels are most likely to be affected in an aircraft. The smoker with a resting COHb of 5% (equivalent to 8,000 feet) will reach 6.5% (equivalent to approximately 10,000 feet) levels following five minutes of smoking a single cigarette. Cigarette smoke yields an average diluted concentration of approximately 400 ppm of carbon monoxide inspired into the lungs. Importantly, levels of carbon monoxide as high as 90 ppm have been reported to cross the face of a subject sitting next to an individual smoking a cigarette. Thus, nonsmoking individuals near smokers could theoretically achieve significant levels of COHb.

The time required for COHb levels to decrease to 50% is approximately four hours. This fact emphasizes the need to avoid that "last minute" cigarette prior to flying as well as smoking during flight. The expressed opinion by many aviators that smoking filtered cigarettes decreases one's carbon monoxide exposure is erroneous. The COHb level has been found to be higher among filter-tipped cigarette smokers than for nonfilter-tipped cigarette smokers. However, this should not be confused with the beneficial effects of filters in lowering tar and nicotine exposure. The higher levels of COHb among filter-tipped cigarette smokers is thought to be due to their inhaling more deeply than nonfilter-tipped cigarette smokers.

Only the effects of carbon monoxide on physiologic and cognitive functions have been discussed thus far. There is further increase in data supporting the hypothesis that chronic low levels of carbon monoxide enhance the development of atherosclerosis and, thus, place the smoker at greater risk for coronary heart disease.[1] A recent study demonstrated that individuals with more than 5% COHb ran a 20 times higher risk of developing atherosclerosis than individuals of the same sex and age with concentrations of less than 3%. Evidence has also been presented indicating that individuals with coronary heart disease have a further lowering of their exercise tolerance in the presence of carbon monoxide due to the inability of the coronary artery to dilate in response to increasing oxygen demands.

The current operational employment of helicopters in nap-of-the-earth and night nap-of-the-earth flight is further compromised by the effects of carbon monoxide. The threat to the helicopter aircrewman may exist both within and without the cockpit. The use of cigarettes prior to a night nap-of-the-earth mission may produce that critical night vision impairment that could result in accident and injury. Recent review on the needs for oxygen in helicopter operations at relatively low altitude at night would assist in decreasing the effects of carbon monoxide on night vision.

In summary, the effects of carbon monoxide on health and performance have been reviewed with emphasis on the aviator. The importance of minimizing carbon monoxide exposure cannot be overemphasized. Levels of carbon monoxide which would be considered safe for the general population may markedly impair the airman's performance. Preventive aviation medicine dictates that every effort should be made to minimize smoking in U. S. Army aircrews.

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ACCIDENT ASSURANCE

USAAAVS

TWO UH-1H PILOTS were to fly a cross-country training mission in support of annual flight minimums. The copilot completed the flight plan and weather briefing when the pilot was 30 minutes late arriving.

After takeoff, with the pilot in the right seat and the copilot in the left, a routine flight of 1.8 hours was completed. The aircraft was refueled at about the halfway point and then continued to destina-

tion without incident. Following lunch and refueling, a civilian flight plan (FAA) was filed to home base with a 30-minute fuel stop at the same location used before. Weather was rechecked at the Flight Service Station, and further deterioration of ceilings and visibilities along the route was indicated. The crew decided that they could safely fly VFR to the refueling point and subsequently to home base.

Crew positions were switched with the pilot now occupying the left seat. Following a normal runup, the aircraft departed and 1 hour later landed at the refueling stop.

After refueling, they departed and initiated a climb to approximately 1,000 feet agl. Ten minutes later, they flew into rainshowers. The crew decided to descend to 300-400 feet agl to increase visibility. As they flew out of the rain, the copilot, without telling the pilot, "beeped" the engine rpm from 6600 to 6400 to conserve fuel at cruise since they would be taking a longer route back to home base. Shortly afterwards, the low rpm audio activated and the rpm warning light came on. At that time the needles were matched and noted to be around 6000 rpm. The needles remained there for 3 to 4 seconds and then the rpm further decayed to approximately 5900.

At this time their altitude decreased to about 250 feet agl and the copilot decided to enter autorotation and rolled off the throttle to the flight idle detent. *(The crew had preplanned prior to flight that in the event of an emergency the person on the controls would remain on the controls throughout the emergency.)* The pilot then called out N1 at 88 percent and torque at 19 psi. Autorotation was initiated at 90 knots and the last observed airspeed was reported to be 40 knots just before touchdown. Both skids were sheared on touchdown and the aircraft slid on its belly, finally coming to rest on the right cabin top and mast. There was no fire and both crewmen sustained minor injuries.

Up to the point where the aircraft flew into rainshowers, this appeared to be a routine training mission being performed by two professional aviators. Beyond that point, safety deteriorated. However, in reviewing the accident data, it is obvious that unit safety had begun to deteriorate long before that.

- The aviation staff officer had failed to implement specific tasks as directed by higher command following a previous accident. This inaction caused a delay in the initiation of a satisfactory unit aviation training and standardization program.
- The copilot's flying skills were average with some weaknesses in conducting emergency procedures, probably related to his inability to properly diagnose the cause of the emergency. This, coupled with a poorly conducted unit program of aviation safety and training, may also have detracted from the copilot's skills in dealing with an in-flight emergency.
- The ASO had failed to implement specific tasks as required by the same directive. This inaction caused a delay in the initiation of a satisfactory unit safety program.
- The crew, upon entering a moderate to heavy rainshower area, decided to sacrifice altitude for visibility (to maintain VFR as prescribed in table 4 of AR 95-1) with a moderate to high tailwind, rather than circumnavigate or select another alternative.
- The copilot decreased engine rpm to a lower cruise setting at a low altitude (300-400 feet agl) without the knowledge and concurrence of the pilot.
- The copilot was apparently flying with his left hand resting on top of the collective and inadvertently decreased the engine rpm to the extent that it appeared to be a power loss.
- The copilot focused his attention on the engine tachometer which registered 6000 rpm for 3 to 4 seconds, losing altitude and rpm.
- When confronted with a decreased power situation, the copilot improperly diagnosed it to be an engine failure and consequently closed the throttle, precluding any action other than an immediate forced landing from an extremely disadvantageous position. This situation is adequately described in the operators manual, chapter 4, par. 4-2.
- The pilot failed to ensure that the emergency was properly diagnosed.
- Neither crewmember deactivated the low rpm audio warning system at any time during the emergency. Leaving the audio on definitely disrupted communication through noise interference and distraction.
- The copilot failed to engage the emergency governor to possibly rectify the deteriorated situation in accordance with the operators manual, chapter 4, par. 4-16.

It is easy to see that many accident-causing ingredients were present in the operation of this unit and that safety had deteriorated long before this mishap. The lack of satisfactory unit training, standardization, and safety programs is almost certain, sooner or later, to produce an accident. But look at it this way: If safety shortcomings can be so readily identified *after* the accident, then they can just as readily be spotted and corrected *before* some mishap occurs.

BlackHawk

Gene Costello
Public Relations Department
Sikorsky Aircraft
Stratford, CT

PERFORMANCE	
speed	145–195 knots (166–224 mph)
cruise	excess of 145 knots (166 mph)
vertical rate of climb	at 4,000 feet, 95°F, 95% IRP, exceeds 450 feet per minute with 11 fully equipped troops or up to 8,000 lbs. external load
endurance	2.3–3.0 hours
propulsion	two General Electric T700 GE-700 turbine engines with 1,543 horsepower each
fuel tanks	ballistically tolerant and self-sealing
rotor transmission	modular and rated to 2,828 horsepower

DIMENSIONS	
overall length (rotors turning)	64' 10"
fuselage length	50' 3/4"
overall height	16' 5"
fuselage width	7' 9"
main rotor diameter	53' 8"
number of main rotor blades	4
main rotor material	composite titanium spar and Nomex fiberglass skin
tail rotor diameter	11' 0"
wheelbase	29' 2"

AIRMOBILE TACTICS are revolutionary. No weaker statement will adequately present the case. Military history will never again record a major engagement. . .in which vertical rising aircraft do not play a prominent and frequently, a decisive part ... Army aviators are changing forever the art and science of war on the surface of the earth.

General Hamilton H. Howze, who made the above statement, chaired the U. S. Army Tactical Mobility Requirements Board, better known as the Howze Board. It was created in 1962 to study, analyze, field test and evaluate "new concepts" of tactical mobility. The Howze Board was charged with developing the Army's emerging airmobile concepts, which employ helicopters as integral, rather than supporting elements of the combined arms assault team.

These revolutionary tactics afford Army ground commanders the ability to rapidly move troops in and out of combat and the flexibility to deal with rapidly changing battlefield conditions.

The Vietnam conflict helped the Army realize that to exploit the full potential of the airmobile concept it needed a new generation of helicopters. This included a true combat assault vehicle capable of carrying the Army's key team – the rifle squad – into battle as a complete unit so that it did not lose vital tactical integrity. This helicopter also would be required to operate and survive in a high threat combat environment.

The intensity of combat in so-called mid- to high intensity wars is expected to be so high and the weapons involved so lethal that airmobile tactics may prove to be the deciding factor in the initial engagement.

Army strategists define a mid-intensity war as one that is nonnuclear and limited by national policy, but is characterized by a sophisticated environment, large armored forces and rapidly changing battlefield conditions. A high intensity war is one in which there is no restriction of weapons, including nuclear.

In January 1972 the Army issued a Request for Proposal for a squad carrying helicopter that could do the job. It was called the UTTAS (Utility Tactical Transport Aircraft System).

The Black Hawk is a twin turbine powered aircraft developed by Sikorsky Aircraft Division of United Technologies. It was selected by the Army on 23 December 1976 as the winner of its UTTAS competition.

The selection of the Black Hawk climaxed a decade-long effort by Sikorsky and the most intensive and thorough flyoff competition in Army history.

The flyoff, known officially as the Government Competitive Test or GCT, proved that the Defense Department's "fly-before-you-buy" policy is not just another slogan. It took 7 months and it was conducted with thoroughness and the highest standards of fairness. As a result the Army achieved its objective of being able to move into the maturity phase of the development program with high confidence and low risk.

Designed to carry 11 fully equipped combat troops plus a crew of three, the UH-60A also can be easily used without modification for medical evacuation (medevac) duty, internal and external movement of cargo, reconnaissance, or command and control purposes. The Black Hawk offers this capability even under the demanding conditions of the Army hot day (4,000 feet density altitude and 95 degrees Fahrenheit), surpassing the carrying capacities of the current Army utility helicopter.

For the first time the Army

Left: UH-60A helicopter has demonstrated bank angles in excess of 90 degrees and high roll rates that provide the agility and maneuverability needed for effective nap-of-the-earth operation

Above: Sikorsky Aircraft's UH-60A helicopter prepares to lift a jeep-mounted 106 millimeter rifle during operational testing at Ft. Campbell, KY. All flying during the tests was done by Army aviators and all maintenance and upkeep was performed by Army mechanics in a simulated field environment

Right: YUH-60A helicopter prototype demonstrates its load-carrying ability during the operational evaluation of the aircraft by the U. S. Army at Ft. Campbell, KY. Total weight of the load, including the three-member flight crew and the seven-member gun crew, was nearly 5,000 pounds (2,268 kg)

has received guarantees in advance from a helicopter manufacturer covering the empty weight, hover ceiling and cruise speed. The Army has offered Sikorsky an award fee for achievement of materiel need reliability levels in first year production aircraft.

The Army intends to procure more than 1,000 Black Hawk helicopters by 1985. The basic production contract awarded to Sikorsky in December 1976 was for $83.4 million to cover the cost of the first 15 production aircraft plus funds for hard tooling and for other nonrecurring start-up expense. This contract is also fixed-price incentive, with the incentives on cost and performance.

The Army also has negotiated options on an additional 353 Black Hawks, with 56 aircraft to be built in the second year, and which presently are on order, 129 in the third and 168 in the fourth.

Meanwhile, Sikorsky is buying long lead time items, negotiating with subcontractors and installing the jigs, fixtures and other hard tooling required to begin production of the first UH-60As. Production began last fall with the first delivery scheduled for August 1978.

In addition to the basic production contract, Sikorsky also has a $61.2 million Army productibility, engineering, planning (PEP) maturity phase contract (MAT) for completing the qualification testing and development of the Black Hawk.

As part of this ongoing maturity effort, the three YUH-60A prototypes used in the GCT are being modified, as far as necessary to bring them into line with the contract specifications for the production aircraft.

Upon completion of the modification work, the aircraft will undergo additional confirmatory testing by the Army's Aviation Engineering Flight Activity at Edwards Air Force Base, CA and the U. S. Army Aircraft Development Test Activity at Fort Rucker.

As was the case during the GCT, one prototype will be sent to Edwards AFB for the engineering flight performance and handling tests. The other two will be used at Fort Rucker for development testing.

The initial production aircraft also will undergo similar validation testing to make sure they meet the contract specifications.

The UH-60A is expected to make the transition from development to production with a

minimum of risk and at the lowest possible cost. This is because of the stringent requirements set by the Army and the time and effort already invested in development of the helicopter.

Sikorsky president Gerald J. Tobias explained, "Sikorsky has been acutely aware of the adverse consequences of delaying needed design improvements. Our policy has been to correct problems during the basic engineering development (BED) phase and not postpone solutions to the production phase. Because of this policy, the YUH-60A, as delivered to the GCT, reflected very nearly the performance which would be expected in the production aircraft.

"No changes are being made to the rotor, drive, propulsion or mechanical flight control systems that will require requalification or entail risk. Only selected productibility changes are planned and these changes will reduce both cost and weight and enable complete compliance with performance requirements."

During the development phase and later during the flyoff, the three YUH-60A prototypes logged nearly 1,450 flight hours. They repeatedly demonstrated their maneuverability and control response in nap-of-the-earth flights that included 90-degree bank angles and 3.0 g loads. This capability is vitally important because assault helicopters must be able to operate from unprepared landing zones and to make extended terrain-hugging flights to effectively carry out their missions and avoid the sophisticated weapons that are expected to be brought into play.

And, since the Black Hawk is fully qualified for instrument flight rules (IFR) operation, missions can be performed both in darkness and adverse weather.

Other accomplishments of the development and test program included flight at dash speeds up to 165 knots and flights at a gross weight of 21,400 pounds, which exceeds the mission gross weight of 16,750 pounds. The Black Hawk prototypes also reached, at mission gross weight, a service ceiling of 18,400 feet.

Speeds up to 50 knots have been achieved in right, left and rearward flight, and external loads weighing more than 7,000 pounds have been successfully carried. This lift capability means the Black Hawk can transport a 105 mm howitzer – complete with ammunition, net-

Right: Shock absorbing tail wheel on Sikorsky Aircraft's UH-60A Black Hawk (UTTAS) protects the tailboom and rotor in high flare angle touchdowns, especially in rough terrain. The main gear on the UH-60A also is energy absorbing, with two-stage oleo struts to cushion the impact of hard landings

ting and ground crew – thereby maintaining vital tactical integrity.

During the operational evaluation phase of the GCT, which was conducted at Ft. Campbell, KY, two YUH-60A prototypes made about 800 flights under simulated tactical conditions, both night and day, carrying troops and typical Army logistics loads.

All flying was done by Army aviators and all maintenance and upkeep was performed by Army maintenance crews under simulated field conditions.

The air transportability of the Black Hawk, a key Army requirement, also has been confirmed. Army maintenance crews loaded the helicopters into C-130, C-141 and C-5A transport aircraft in elapsed times well within the Army's requirement.

This air transportability indicates that the UH-60A can be deployed rapidly to support combat operations anywhere in the world. One UH-60A can be carried in a C-130, two in a C-141 and six in a C-5A. Self deployment also is possible by using auxiliary fuel tanks in the cabin.

The YUH-60A has ability to achieve its high performance because of advanced, yet proven features that have been incorporated in the design. These major advances include:

- Corrosion proof, ballistically tolerant main rotor blades that have a titanium spar and Nomex fiberglass skin. The blades, which are completely interchangeable and pretracked to simplify replacement, improve overall performance, safety and maintainability. Tests have shown that these blades are highly tolerant to impacts by 23 mm high explosive incendiary (HEI) projectiles.
- A fully articulated, aerodynamically clean main rotor head with elastomeric bearings that need no lubrication or seals, use fewer parts, cut maintenance by up to 60 percent and give greatly extended service life. The main rotor also is equipped with a unique self-tuning bifilar vibration absorber that reduces vibration, maintenance and crew fatigue, while at the same time improving the reliability of the avionics, engines and airframe.
- A virtually maintenance free composite cross-beam tail rotor that eliminates all bearings and lubrication requirements.
- A modularized transmission. Four of the five modules are completely interchangeable, left and right, and all have sepa-

rate chip detectors. If a problem occurs in one module, it can be replaced without contaminating the entire system. This gearbox is required to operate a minimum of 30 minutes without oil, but it has run for more than an hour under flight load conditions in lab tests after the oil had been drained off.

Since the Black Hawk is a combat vehicle that must be able to operate safely in a high threat environment, it has been designed to be survivable.

A key to battlefield survivability is reduced vulnerability or increased ballistic survivability – the ability of the aircraft to tolerate hits without crashing, making a forced landing, aborting the mission or having to undergo lengthy repairs.

According to the combat records compiled by the Army for helicopters that operated in Southeast Asia, the most frequent causes of crashes or forced landings resulting from hits were damage to engine system, flight controls, fuel system, lubrication system and injuries to the crew. Sikorsky has designed the UH-60A to overcome these hazards without depending upon large amounts of armor.

For example, the main and tail rotor blades on the UH-60A are ballistically tolerant as are the upper controls, the main rotor hub and the tail rotor drive shaft. The pilot and copilot controls are redundant, along with the hydraulic, electrical and fuel systems.

Sikorsky also made a detailed analysis of more than 2,500 combat losses and mishaps involving operational Army helicopters and based on this study and its own experience, has incorporated more than 40 specific safety features in the Black Hawk.

The energy absorbing landing gear, for instance, is designed to allow sink speeds as high as 2,100 feet per minute without fuselage contact. This landing gear, which has a tail wheel to protect the tail boom in high flare landings will also (in combination with the seating arrangement and crashworthy fuel system) protect the crew and troops in a 2,500 foot per minute vertical crash.

Compared to today's Army utility helicopters, the UH-60A has a greater lift capability, faster cruise speed, longer range, greater maneuverability, more flexibility and adaptability, requires dramatically less maintenance and will be able to survive on the high threat battlefield.

EPMS CORNER

Enlisted Personnel Management System

Why Didn't *I* Get Promoted?

SFC Douglas E. Allen
Aviation Career Advisor
U. S. Army Military Personnel Center

IT HAPPENS EVERY time a promotion list is published. Letters by the score arrive at MILPERCEN, DCSPER, SMA and at a dozen other addresses.

They read alike. Only the names and service numbers are different. Each seeks an answer to the gnawing, imponderable question: Why didn't I get promoted?

The letters are written by good Soldiers who believe they are doing their best.

Take this one from an old Soldier in a FORSCOM unit in CONUS:

"Upon completion of the last E-9 promotion board, I found it hard to believe my name did not appear. I know my records should be clear. I am dumb-founded as to why I was not selected. I would appreciate a complete records audit and any help and/or advice you could give towards bettering myself. Being a trouble shooting first sergeant, it's hard to get away to take care of personal business, especially so far away..."

Or this one from an E-6 stationed in Germany:

"I've checked the last promotion list for E-7s and it seems my name is not on it. I've tried to find out what I needed through my chain of command and I feel I received an unsatisfactory answer..."

An E-8 in the Midwest put his question pointblank: "Who on God's green earth can tell me why I wasn't selected for promotion?"

There is a poignancy in each letter. Each Soldier is career motivated. Each perceives himself or herself as having "done the job" and more.

All perceive themselves as having given the Army their best. **Possible Indicators:** Let's examine the OMPF file of each of these noncommissioned officers and see what may have been the reason for nonselection. Keep in mind we are looking at possible indicators in the file. We do not know what discussion went on among promotion board members as they voted on the merits of each Soldier in the zone of consideration.

First, the busy first sergeant. He's 45 years old and has 27 years service. His file dates back to 1947. He served first in the Navy, then joined the Army. With the exception of minor breaks in service, he has been Regular Army all the way. His file contains MOS evaluations dating to 1960 and efficiency reports from 1964. The most recent MOS test score reads 126 for his primary (67Z50) and 94 for his secondary (71L50). His file contains several letters of commendation and appreciation. Frankly the file looks good. But – for some reason – he was not selected. Possible reasons are:

- Low secondary MOS score.
- Enlisted efficiency report weighted average (EERWA) was only 124 at the time the board convened and 125 was average for E-8s Armywide at that time.
- Minimal effort to attend any military schools and no effort to strengthen his civilian education since his 1953 GED equivalency.
- In three more years, QMP will require him to retire. What is his real potential and contribution as an E-9?

These factors plus a 15 to 25 percent selection rate *may* have influenced nonselection.

Next, the staff sergeant stationed in Germany. Possible reasons for his nonselection to E-7:

- Average and below average PMOS evaluation test scores.
- Neither qualified for nor been awarded a secondary MOS as required by current directives. (It's a must for E-6 and above.)

• A recent Article 15 (for a serious offense).

• An EER for July to January that boasted three excellent ratings and three above average. The rater marked him in the middle of "promote ahead" and "promote with" contemporaries.

• The file shows attendance at an NCO academy in 1970 and a leadership course in 1973.

• DA Form 2-1 says high school GED equivalency in 1969 but nothing in the OMPF to back it up. The file does show he tried and failed a GED test in 1962.

• No effort to further civilian education despite proximity to education centers in the last 5 years.

These factors should not be considered decisive. But when only 20 to 35 percent can be selected from an outstanding field, everything in the file assumes added significance.

Now, let's examine the OMPF of the E-8 in the Midwest. He faced tough competition. Only the top 20 percent could be selected when his records came before the E-9 promotion board.

Weak areas in his file include:

• EERWA of 109. A weighted score of 121 is average for his grade.

• The last EER considered by the board showed five "excellents" and one "outstanding." Earlier EERs had been max. Performance has been slipping since November 1971.

• PMOS score was 105 when the board looked at his file. That's barely average for his grade, skill level and MOS. (Since then his MOS score dropped to 95. He won't even be considered by the Sergeants Major Academy board when it meets.)

• PMOS proficiency scores have been dropping since 1971; SMOS score of 84 is well below average.

Past laurels are not enough. The chief of his division in the career management field pointed these factors out in a letter and added, "I am telling you as gently as I can that you are currently noncompetitive for promotion, *in my personal view*. Past laurels will not get you to E-9; if you really want it, then get to work. No one else is going to do it for you."

Analysis of these three files points up reasons why a noncom may not have been selected for promotion:

• Low EERs.

• Low MOS scores.

• Lack of a SMOS and a good score to go with it.

• Failure to improve both military and civilian education.

• Failure to ensure all awards and citations get into the OMPF.

Each of these areas can be corrected by the Soldier – if the Soldier really wants to get promoted.

As an eager E-5 wrote recently:

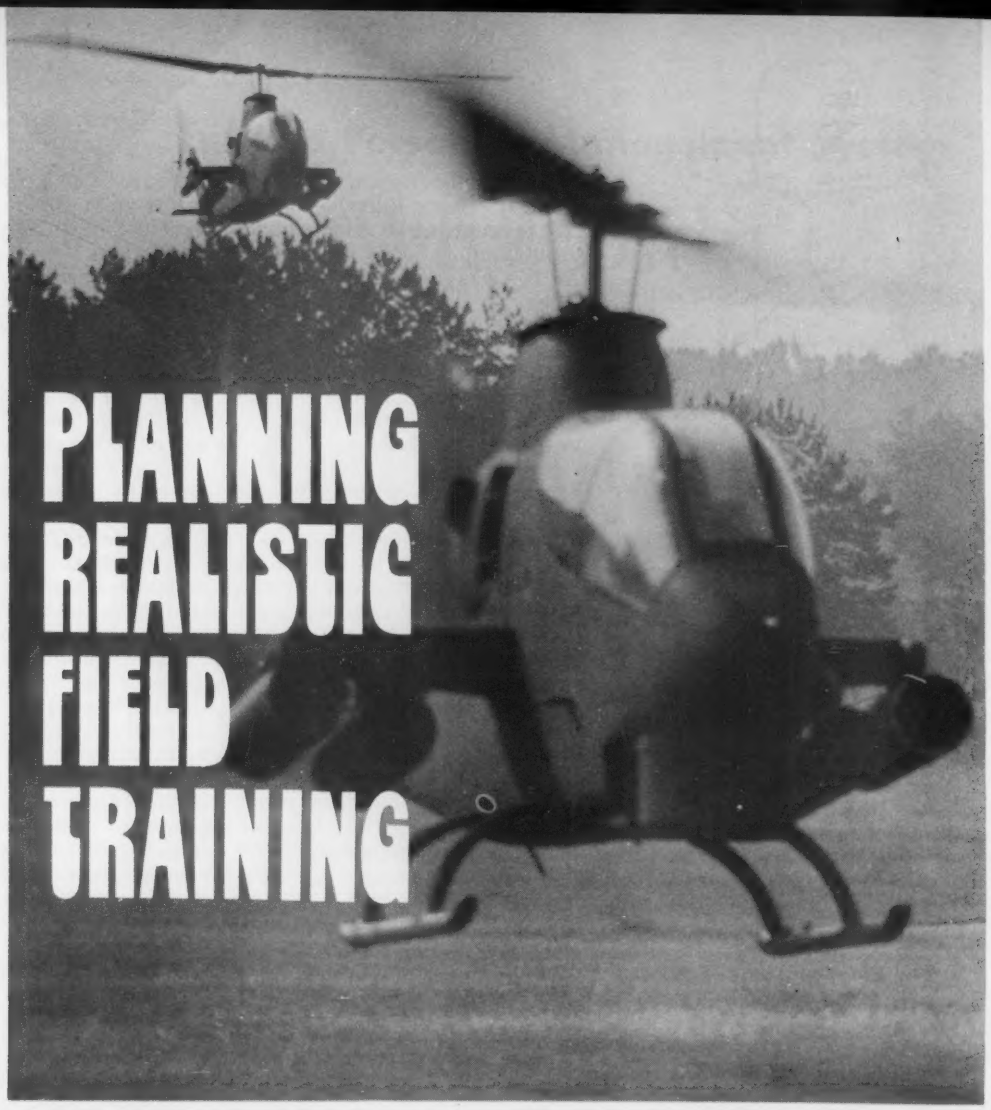
"I enjoy my job, I relish the pressure, and the hours are only a challenge...but can you explain to me why I'm still an E-5....I could have been promoted three times in the last eight months in my SMOS. Explain this to me. Yet I still have a positive mental attitude, I'm positive that I am being screwed to the wall. Have no fear, for as I walk deeper into the valley of death, I will not quit. No demon will drive me to my knees. My next year will be more productive than my first. But what is my reward?"

He got it.

He's been E-6 for some time now. And – he's driving hard for E-7.

GLOSSARY

CONUS	Continental United States
DA	Department of the Army
DCSPER	Deputy Chief of Staff for Personnel
EER	enlisted efficiency report
EERWA	enlisted efficiency report weight average
FORSCOM	Forces Command
GED	general education development
MILPERCEN	Military Personnel Center
MOS	military occupational specialty
NCO	noncommissioned officer
OMPF	official military personnel folder
PMOS	primary MOS
QMP	Quality Management Program
SMA	Sergeant Major of the Army
SMOS	secondary MOS



USAAAVS

IF YOUR UNIT were to be deployed to a combat zone tomorrow, would you be ready? Are your aviation personnel trained to perform and survive in a hostile environment?

One answer to combat readiness is realistic field training. But the transition from a garrison aviation environment to a field setting emphasizing realism creates problems common to all units. The key to eliminating or reducing these aviation hazards is the insurance of full consideration for safety during the planning as well as the execution of field exercises. Emphasis should be placed on the following safety hazards found most often during field training.

• Airspace management around tactical helipads and forward area rapid refueling points (FARRP) is frequently neglected. For tactical reasons, FARRPs and helipads must be located to afford maximum concealment of aircraft and equipment. This is a conceded necessity, but it also increases the possibility of a midair collision. One possible solution to this problem would be to establish one-way routes and checkpoints into and away from FARRPs and helipads. If several units are to use these areas, ensure that routes are widely disseminated and strictly enforced. Landing areas can be marked with lights for night operations, and radios can be used for traffic control.

• Another area where additional planning is needed is operation of FARRPs. This can be a hazardous area without sufficient NCO supervision at all times. Ensure that adequate protective clothing and equipment is available and used by POL handlers, and that adequate grounding is available and used every time an aircraft is refueled. Fire extinguishers should be checked before the field problem begins. They should be fully charged and the proper type to extinguish a POL fire. Fuel sampling and testing procedures should be established to detect contaminated fuel before it is put in the aircraft.

• Training missions often require that aircraft

be loaded to near maximum gross weight with troops and supplies. Weight and balance records should be checked for accuracy. Ensure that aviators brush up on go-no-go procedures, density altitude and emergency procedures. Emphasize the importance of thorough preflights and passenger briefings.

- Inventory survival kits for missing items and order shortage items. Ensure there is no shortage of Nomex flight suits and that helmets are properly fitted.
- Aviator fatigue can be a problem during field training. Aviators often exceed their physical capabilities because of the long hours of flying and other duties or lack of adequate sleeping accommodations. This fatigue is usually induced by commanders requiring mission accomplishment beyond the capability of a tired aviator. Therefore, it is important that crew rest requirements be established and strictly enforced.
- Plan to use available personnel and equipment for flight following or air traffic control during field training. It is difficult to maintain communications with aviators flying NOE, but a sincere effort must be made and this requires ad-

vance planning. In some areas, requests for additional radio frequencies to be used in field training must be made as much as 6 months in advance. This makes early planning a necessity.

• Availability of timely weather information for flight planning also requires advance planning. Weather personnel in the field without adequate means of communication are not going to do your aviators any good. Observations must be readily available to both aviators and weather forecasters who may not be co-located. Additionally, the forecaster will need information from outside the maneuver area if valid forecasts are to be provided. Extensive communications planning must be accomplished early in the field training planning cycle before that forecaster can make a valid forecast and get it to you in the field.

• Pilots should be cautioned about approaching tactical helipads and refueling points at a high rate of speed. Planning for an approach will allow the aviator to arrive at the intended touchdown point at zero airspeed as opposed to the 80 knots sometimes presently observed. Rapid acceleration/deceleration of the aircraft should be avoided unless absolutely necessary. Pilots should plan what they are going to do in flight, particularly on approaches, to preclude the necessity for exaggerated decelerations during approaches. Downwind landings and takeoffs should be avoided in field training just as they are avoided in garrisons, and for the same reason. Hovering at 50 feet and using pedal turns at that altitude is fine when required for tree clearance but these maneuvers can lead to unnecessary problems when performed in the POL area.

• When pilots are flying in the rear area, and altitude is available that can safely be used without a possibility of enemy air defense detection, that altitude should be used. The principle that altitude above you and runway behind you are not much use still applies today as much as it did 10 years ago.

Garrison preaccident plans normally include requirements that ensure everyone concerned will be notified when an accident occurs. But in the field, mishap reporting is not always done in accordance with AR 385-40. Everyone usually gets the word when an accident occurs, but the same cannot always be said about a precautionary or forced landing. Aviator proficiency usually means the difference between a forced landing and a major accident, so forced and precautionary landings also need to be reported. The data obtained from these reports frequently means the prevention of a future accident.

The problems we have talked about here are by no means the only ones you can expect to encounter during field training, but they do occur most often. These problems and the lessons learned can be beneficial to you in planning your field training. When your field training is completed, share your experience and help establish the fact that realistic training can be conducted without sacrificing safety.

DURING THE MORNING hours, the pilot performed administrative missions between the downrange command post (CP) and the main post. It was on one of these missions that he transported the squadron commander to the main post and later returned him to the downrange CP. The squadron commander then told the pilot to return and pick him up about two hours later for a command and control mission in support of a field training exercise.

The pilot departed the area in an OH-58, returned to the airfield, refueled, and had lunch. He then returned to the squadron CP and picked up the squadron commander, who was to act as observer. The squadron commander told the pilot that this would be a tactical mission requiring NOE flying. He also told him that the ground elements, then deployed in blocking positions oriented to the west, had begun to pick up contact from the force element. The pilot performed the runup while the commander made a map reconnaissance and then briefed the pilot on the area in which they would be operating.

They took off and flew northwest to a particular grid line. Upon reaching the area, the pilot started flying NOE in a southerly to northerly pattern, progressing westward. During this phase of flight, the squadron commander acted as observer, using the pilot's map. Although the map indicated the location of various wires, the commander was unaware of their meaning or location on the ground. About midway through the flight, he spotted his S-3 and told the pilot to land. After talking with the S-3 for several minutes and obtaining another map, which was not marked with the wire hazards, the squadron commander again boarded the aircraft.

The pilot continued to fly NOE moving westward. Ground elements and dust indicated that the opposing forces were moving east. As the pilot cautiously moved westward along the route, he encountered an armor column. To avoid detection, the commander told the pilot to depart the area. The pilot made a right turn to a southerly heading and increased airspeed. His intent was to keep the aircraft low to mask his position behind a ridgeline as they proceeded eastbound. While traveling at about 80 knots and 25 feet agl, the pilot flew between two large trees and the aircraft struck two strands of telephone wire. One wire was cut by the rotor blades and the other caught on the left skid. The aircraft violently yawed left and right until the left wire snapped, allowing the helicopter to return to a normal in-trim condition. The pilot, thinking he had lost antitorque control, made a low shallow approach, and landed without further damage.

The cause of this accident was inadequate unit training. The pilot, who had 2,600 hours' rotary wing experience, received his initial NOE qualification training and subsequent renewal during an annual standardization checkride in a UH-1. Because of the inadequate training, he made several errors. To begin with, he was not qualified to fly NOE in an OH-58A as he had not received NOE qualification training in this aircraft. In addition, he did not know the qualification requirements for NOE observers, the minimum crew required for NOE flight, or the required content of NOE preflight briefings. Consequently, he accepted a nonrated, untrained ob-

Far left: Damage to right side of fuselage and door.
Left: Damage to left windscreen.
Below: Left front skid with wire still hooked to tow ring.

server which was in violation of paragraph 1-5, FM 1-1, and paragraph 3-26, FORSCOM Regulation 350-3, which states: An aeroscout observer must have successfully completed all aspects of an authorized terrain flight qualification training program except those tasks only a rated aviator can perform. This training is necessary for the observer to be able to assist the pilot by navigating.

Although the squadron commander/observer used the pilot's map during part of the mission to interpret their position, the commander did not know what the wire markings meant. And the map he used during the latter portion of the mission did not even contain obstacle markings. In addition, the pilot did not conduct a comprehensive preflight briefing concerning the pilot's and squadron commander/observer's duties contained in paragraph 1-5, FM 1-1, nor brief the commander on the known hazards marked on his map as required by paragraph 1-6, FM 1-1, and paragraph 3-31B (2), FORSCOM Regulation 350-3.

Accident data shows that the operations officer and standardization officer were aware that the pilot was not qualified to fly NOE in an OH-58A. However, they were both TDY at the time of this mission. The assistant operations officer was new in the unit and received the request for this mission from the squadron S-3. He was aware that the pilot was qualified and current in the OH-58, but was unaware that he was not NOE qualified in the aircraft. However, this was of little consequence because when the mission was scheduled, the S-3 did not even mention that NOE flying would be a requirement. In fact, no one, not even the pilot, knew that NOE flight would be involved. The squadron commander assumed that the pilot was fully qualified in every respect and at no time during the flight did the pilot indicate otherwise. The squadron commander also was unaware that the wires which they struck were marked on the pilot's map and that he should have been observer qualified for this mission.

If accidents such as this are to be prevented, commanders and aviation safety officers must reemphasize and ensure that published requirements are complied with. They should see that all aviators are properly NOE qualified in the aircraft they fly and that a qualified observer is required on all flights. A comprehensive program for observer training should be developed, published and monitored by all aviation and tactical units engaged in terrain flight operations. In addition, a comprehensive preflight briefing, to include the location of all wires and obstacles, must be conducted for each pilot, observer, and passenger before terrain flight.

NOE flying requires crew coordination and teamwork from start to finish. Navigation must be highly accurate to maintain geographic orientation and the copilot or observer must constantly inform the pilot of the terrain and obstacles that they expect to encounter by thorough map reading.

Unless crewmembers are well trained, qualified, and proficient in their duties and aircraft, commanders can expect needless accidents like this one.

Cold Fingers

For you troops who are flying in the north country or high altitudes and are suffering from cold hands (including fingers), there are gloves available which will help solve your problem. The gloves can be requisitioned from S9T (Defense Personnel Support Center, Philadelphia, PA 19101) and are listed below:

Gloves, Shell, Flyers' (Cost $7.08)
Small 8415-00-785-7407
Medium 8415-00-261-4770
Large 8415-00-261-4768
Inserts, Wool, Nylon Knit (Cost $.86)
Small 8415-00-682-6673
Medium 8415-00-682-6575
Large 8415-00-682-6577

SDU-5E Distress Light

I ordered a battery (NSN 6135-00-269-5843) for my SDU-5E distress light which was listed in TM 55-8465-215-10. This is not the same type of battery which I removed from the light.

I am happy that you brought this problem to my attention. The battery as listed on page 24 of TM 55-8465-215-10 is in error. This TM is being updated and will show the correct battery to be the BA-1574/U (NSN 6135-00-073-8939).

Antiexposure Suits

Our unit has a requirement for antiexposure suits since we fly over large bodies of water. We requisition the CWU-16/P which is a one size only quick don suit. Unfortunately, pilots/aircrewmembers, and in some cases the passengers in some of our aircraft, cannot quick don the CWU-16/P. The CWU-21/P is a sized/fitted antiexposure suit that is worn under the regular flight suit. Why can't we get both suits?

Glad you asked that question. This problem surfaced in the past. At the direction of the DRCPO-ALSE the problem was again addressed, and I am happy to say resolved. A correspondence in-process review (IPR) was held 24 August 1977 recommending the CWU-21/P be type classified Standard "A," and will be included in the next change to SB 700-20 and CTA 50-900. Authorization is: one per aircrewmember in climatic regions where flights over bodies of water having temperatures of 50 degrees Fahrenheit and lower are encountered.

NOTE: The CWU-21/P is authorized for wear by all aircrewmembers plus passengers where space in the passenger compartment is inadequate to don the CWU-16/P. The CWU-21/P is donned under the flight suit prior to mission over cold water areas.

What's Your Problem?

Please let PEARL know what problems you are experiencing with your aviation life support equipment (ALSE). Also, what some of you have done to solve your problems. Let's share our problems and solutions with our fellow aircrewmembers.

If you have a question about personal equipment or rescue/survival gear, write Pearl, DARCOM, ATTN: DRCPO-ALSE, POB 209 St. Louis MO 63166

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

WINTER COMEDY

ANNUAL AWARD Monthly Winner CONTEST

Captain Clinton M. Kounk
355th Aviation Company (HH)
Ft. Eustis, VA

RECENTLY, WHILE reading through a few old *AVIATION DIGESTS*, I ran across an article, "Winter Has A Special Meaning" by Arnold R. Lambert. "What does winter mean to you?" That question refreshed my memory of a flight that not only involved winter weather but a sequence of events that bordered on disaster. Fortunately for all concerned, we can still talk about it.

The mission was a Corps of Engineers river survey. Takeoff was scheduled for 0830 hours in a UH-1B Huey. The pilot arrived around 0745 hours and began preflight preparations. Two passengers, a Corps of Engineers representative and a local news media representative, arrived shortly after 0800.

Following a short briefing on the route of flight, the pilot continued flight planning. Planning was easy; he'd been over this route several times. He planned a 6-hour roundrobin flight with two intermediate stops for fuel. Checking with the local Flight Service Station (FSS), he was informed that weather was forecast 2,000 feet broken (first stop), 1,600 feet overcast (second stop) with visibility 5 miles plus throughout the area. A frontal system was expected by late afternoon with visibility reduced to less than 3 miles in snow showers.

With the temperatures below freezing the pilot was asked if he wanted to preflight inside the hangar or outside. "Go ahead and take it outside," he replied. Returning to operations after securing his flight gear, he realized departure time was near and his copilot had not arrived. The copilot worked the graveyard shift across town and had been late before. He called flight service to change departure time, informed his passengers of the situation, and that they would depart upon arrival of the copilot.

He joined the aircraft, opened the checklist and went to work. While checking the logbook he noticed an intermediate inspection had been completed the day before (2404 attached to the -13). The inspection write-up on the -13 had been signed off, but no entry had been made for maintenance operational check (MOC) due. He made a mental note to check with the crewchief and completed the preflight.

Returning to the hangar he approached the mechanic who completed the inspection to inquire why no write-up had been entered for MOC due. His reply, "Technical inspectors (TIs)

make MOC and test flight entries."

He then proceeded to question the crewchief who gave the same reply and sarcastically added, "Why tell me." He thought back to his maintenance days and the responsibilities he had for his aircraft. Times have changed. He finally asked if they would check with the TIs. After all, the aircraft was to be mission ready.

Meanwhile, the copilot was still a no-show. Reluctantly he informed his passengers of the situation. The operations sergeant called the copilot's home. His wife said he wasn't home yet and she knew nothing of the flight. That was it! He would get another copilot. The facility commander and maintenance officers were attending a conference out of town; both facility instructor pilots (IPs) were gone, one sick, the other on an admin run. Attempts were made to locate him with no success.

Maintenance informed the pilot the MOC had been entered in the logbook. At this point he thought things might be looking up. Was he ever wrong! He told lead mechanic Smith he needed the crewchief for an MOC on 892. Smith explained, "It's not my aircraft, but I'll tell Jones. It's his."

Back at the aircraft, he waited and waited. Nobody showed. Returning to the hangar he asked Smith, "What happened to the crewchief?" "I told Jones," he said.

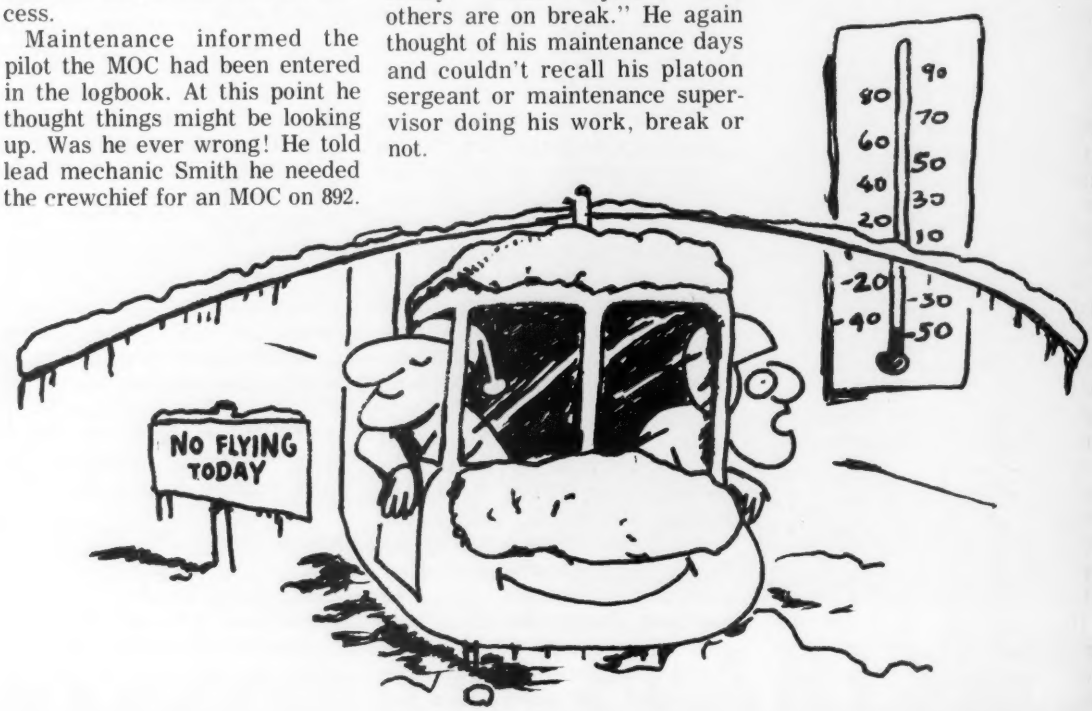
About now he realized it was hopeless and headed for the aircraft to retrieve his gear. On the way he ran into mechanic Johnson. "What the heck," he said, "I'll give it one more try."

"Hey Johnson, how about pulling a MOC on 892." "I can't," replied Johnson; "it's break time. Anyway, Jackson's the crewchief. Get him!" That was it!

Back to the aircraft again – he saw Jones waiting. He had positioned a large fire extinguisher by the aircraft. As he approached Jones he commented, "High paid crewchief today." Jones replied, "The others are on break." He again thought of his maintenance days and couldn't recall his platoon sergeant or maintenance supervisor doing his work, break or not.

He climbed into the cockpit, went through the checklist, cranked the engine – everything in the green. Jones gave him thumbs up and he nodded his head, roger! Continuing the run-up checks he visually checked outside the aircraft. Jones was walking back to the hangar. "What's this," he said to himself; "must be Jones' break time, too!" He finished the runup, completed shutdown, checked for leaks and signed off the MOC (he was on orders as a maintenance test pilot).

Returning to the hangar he was informed that his copilot had called saying operations had not confirmed his flight the day before. Therefore, he wouldn't be able to make it. The IP on the admin run called and was informed of the situation. He said he would return shortly. Finally, a copilot.



On the copilot's return the pilot briefed him on the mission. They were now down to one passenger. The news media representative had left. They picked up an instrument flight rules (IFR) kit from the dispatcher, glancing briefly inside and headed for the aircraft. The pilot proceeded through the checklist. Since no fireguard showed, the copilot did the job. They completed the runup, hover check and departed.

Their first leg was an uneventful 65 minutes. Landing at Rockford, their first intermediate stop, weather was good and visibility better than 10 miles. They refueled and prepared to depart.

As the pilot proceeded through the engine start and run-up procedures, the copilot stood fireguard. He first checked the right side, then the left. On the left side he took more than the normal amount of time. The pilot began to feel uneasy.

He finally appeared; however, his expression made the pilot feel uncertain. As he crossed in front of the aircraft, he paused, raised his right hand, and displayed big as life, a pair of needle nose pliers! Well, you can imagine the pilot's expression.

"Where did they come from?" asked the pilot, as the copilot was replacing the fire extinguisher. "On the engine deck." The pilot thought back to his preflight – he had looked in the engine cowling but had not opened it. They finished the run-up, made a hover check and departed.

They followed the Rock River north, Pecatonic River west and northwest towards Darlington. By the time they reached Darlington, visibility had diminished to less than 3 miles. They maintained 1,500 feet indicated and headed for Guttenburg on the Mississippi. The pilot turned a nondirectional radio beacon (NDB) that was directly along their route and the Dubuque VHF omnidirectional range (VOR), their second intermediate stop.

Continuing westbound, they encountered heavy snow, reducing visibility at times to less than one-half mile. The copilot, a well-qualified CW4, was at the controls. They gradually descended to maintain visual flight rules (VFR) and began preparations for going IFR. The pilot checked the Low Altitude Enroute Chart and decided they would have to go to 4,000 feet. The copilot asked if Dubuque had an instrument landing system (ILS). The pilot thought so, but he would check the approach charts. He searched the IFR kit for Volume 5. You guessed it, no Volume 5.

He told the copilot to maintain VFR and head straight for Dubuque, tracking in on the 040 radial to avoid towers northeast of the city. While tracking inbound the copilot expressed difficulty in maintaining VFR. The pilot told him to stay on the gauges while he maintained visual contact with the ground. This became increasingly difficult due to heavy snow cover and limited visibility. Minutes later though, visibility increased to about 1 mile and they were able to maintain VFR with little difficulty.

As they approached Dubuque the pilot attempted to contact Cedar Rapids Radio. Dubuque tower only monitored very high frequency (VHF) 119.5 and aircraft equipped only with a VHF emergency transmitter did not have a compatible frequency.

From past experience the pilot knew the tower had a portable VHF emergency receiver, but Cedar Rapids Radio would have to relay a message to turn it on. No luck, negative contact with

Cedar Rapids. Every conceivable frequency combination was tried.

"Why doesn't this thing have a decent VHF radio?" the pilot mumbled.

They picked up the highway north of the airport. Visibility had now dropped to three-quarters of a mile. They spotted the tower. The beacon was on, the field was IFR, no commo and if they land – violation!

They turned around and headed back up the highway. Looking for what – a telephone! Luck was finally with them; they spotted a state maintenance garage. They landed, called the tower and explained the situation. The tower turned up their radio; they departed the garage and landed at the airport about one-quarter mile visibility.

On the ground they checked the weather for their destination. As you might have guessed, the front moved in early with no let-up in sight. Moderate to severe icing was being forecast from the surface to 10,000 feet. A Citation landed with a moderate coating of ice and reports were being received that a Cessna 182 had crashed in the vicinity of their destination from icing. Securing the aircraft, they took their chances on the highway.

RELAX and live

Continued from page 4

Relaxation Response. The *second* technique is called the *relaxation response*, a name based on the result of practicing the exercise about to be described. This technique was originated by Herbert Benson about 6 years ago but has not been as widely used as progressive relaxation. Benson and his coworkers were attempting to find out what makes meditation work. They discovered that apparently only four things are necessary to achieve profound levels of relaxation.

- First, there should always be a constant stimulus, such as a sound, word or phrase repeated silently or audibly. Staring at some object also seems to be suitable. Apparently, this procedure helps you focus your attention on one thing and avoid thinking about other things.
- A passive attitude also is important. If distracting thoughts occur during repetition of the gazing, they should be disregarded.
- Third, decreased muscle tone is necessary. This can be achieved by merely sitting or reclining in a comfortable position.
- Finally, a quiet place in which to practice helps decrease environmental distractions.

Those who have practiced transcendental meditation will recognize many similarities. It appears that Mr. Benson and his fellow workers have separated the effective techniques from the mystical aspects and made them available for use by all who want to learn how to relax more completely.

To achieve the relaxation response, follow these instructions: Sit quietly in a comfortable position; close your eyes; then deeply relax all your muscles beginning at your feet and progressing up to your face. Keep them deeply relaxed. As you breathe out say the word *one* silently to yourself. For example, breathe in ... out, *one*; in...out, *one*. Continue this for about 15 to 20 minutes. Do not worry about whether you are succeeding in achieving a deep level of relaxation. Retain a passive attitude and permit relaxation to occur at its own pace. If distracting thoughts occur, ignore them.

Selecting a Method. It is difficult to say which method will work best for you. Some prefer just to lie down and relax, as the relaxation response exercises require. Others prefer some sort of structured system like progressive relaxation. Why not try both and select the one that seems to produce the most comfortable end results for you? Perhaps you will find both useful. In any event, the sooner you begin the sooner you will be on the road to a more relaxed and less stressful life.

Sequence For Relaxing Muscle Groups

Relaxation of Arms (Time: 4 to 5 min)
- Clench right fist, hand and forearm
- Clench left fist, hand and forearm
- Clench both fists, hands and forearms
- Flex both biceps
- Flex both triceps (straighten arms)

Relaxation of Facial Area, Neck, Shoulders and Upper Back (Time: 4 to 5 min.)
- Wrinkle forehead
- Frown and crease brow
- Close eyes tightly
- Clench jaws
- Press tongue against roof of mouth
- Purse (or pucker) lips
- Press head back, roll to right and then left
- Press chin down on chest
- Shrug shoulders

Relaxation of Chest, Stomach and Lower Back (Time: 4 to 5 min)
- Breathe in deeply and hold
- Tighten up stomach and abdominal area
- Draw stomach and abdominal muscles in
- Push abdominal and stomach muscles out
- Arch lower back

Relaxation of Hips, Thighs and Calves (Time: 2 to 3 min)
- Flex buttocks and thighs
- Press heels down against floor
- Straighten knees
- Point toes downward
- Cock feet and toes upward

Complete Body Relaxation (Time: as desired)
- Keep eyes closed
- Breathe slowly and feel yourself becoming heavier
- Think about raising right arm, notice the tension, and let it disappear
- Continue breathing slowly, relaxing as long as desired

Adapted from Behavior Therapy Techniques by Joseph Wolpe and Arnold A. Lazarus, New York, Pergamon Press, 1966.

ATC ACTION LINE

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

I've heard that the controller's manual is going to be changed. Any truth to this?

Yes. The air traffic control (ATC) manual is getting a new look. Per Federal Aviation Administration's (FAA's) October Air Traffic Service Bulletin, two important changes to Handbook 7110.65 are coming your way. These are in addition to the 1 January 1978 change in number to 7110.65A.

First, the format will change to two column continuous print with all notes, references, illustrations and examples contained in the body of the text after each paragraph. The new format should be as easy to read and use as the present model.

The reason for changing will be very apparent when you see the size of the "A" model. The new version should be about two-thirds the size of the old one. The significance of this remodeling is the amount of paper, ink and energy that will be saved. In the normal life of one edition (one handbook and seven changes), more than 3.8 million sheets of paper and the ink and energy to print them will be saved.

Another feature will be the introduction of a new "thumb index." Chapter numbers and titles will be printed on the back with black tab marks that correspond with black marks on pages preceding the chapters. This new index will make the handbook easier to use. After trying the new version, it is hoped that controllers will agree that – in addition to the saving in resources – the product has been improved.

Can clearances be made unclear? I have received some with qualifying phrases which can be misinterpreted.

You are so right about this wrong doing! It happens when a *taxi into position and hold* clearance is issued along with a "qualifier." Phrases such as *behind landing traffic* or *after the departing aircraft* can cause a lot of confusion. If the pilot should be watching another "bird" either on the same or a different runway, it's possible the pilot will do something that the controller did not intend. Issuing of pertinent traffic is proper. However, in no case can the pilot be issued taxi clearance onto the runway predicated on execution of the clearance after the traffic has done something. In other words, the controller cannot relinquish or transfer separation responsibility to the pilot. If you are in doubt, advise you are complying only with the initial portion of the clearance and await further positive control clearance instructions.

Mountain flying demands more than just plain every day skill. Leaving the plain and prairie for the rugged higher elevations also introduces temperature changes. What effect does this have on indicated altimeter reading?

Plenty. An unhealthy paradox occurs wherein a climb to higher elevations normally results in a lower temperature reading. The indicated altitude will be higher than the actual aircraft altitude. For example, on a 13,000 foot route with an outside air temperature (OAT) of -40 degrees Fahrenheit (F), the aircraft may be 1,500 feet lower than indicated altitude. In another case, on a 10,000 foot route with an OAT of -30 degrees F, the aircraft may be 1,000 feet lower than the indicated altitude readout.

Readers are encouraged to send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

Notice Re: TC 1-135

DUE TO THE increase in requests from units worldwide for the Programed Texts listed as references in the Aircrew Training Manual, TC 1-135 (DRAFT), some requests probably will be partially filled. With the requirement to furnish the instructional departments at the Aviation Center as well as field units with these Programed Texts, stockage level must be maintained. Requests that are partially filled can be resubmitted in 30 to 60 days and they will be completed.

Contact for these Programed Texts is U.S. Army Aviation Center, Department of Academic Training, Extension Training Management Branch, ATTN: ATZQ-T-AT-E, Fort Rucker, AL 36362.

concepts

priorities

Army Aviation Employment Conference (AVNEC)

doctrine

IN ANTICIPATION of an Army Aviation Systems Program Review (AAPR) that was scheduled for November 1977, the U.S. Army Aviation Center (USAAVNC) solicited worldwide field comments from major commands on a list of candidate agenda items. The field responses indicated strong interest for an AAPR, and numerous operational and materiel shortcomings relating to Army aviation were reported. Current planning now, however, calls for the AAPR to take place during late November 1978.

In the interim, USAAVNC has proposed —and the Commander, U.S. Army Training & Doctrine Command (TRADOC) has approved—the convening of an Army Aviation Employment Conference (AVNEC) at the Aviation Center during the period 28 to 31 March 1978. The AVNEC will be aimed at achieving a consensus regarding Army aviation doctrine, tactics, employment concepts and prioritizing new aviation equipment items which will be reviewed indepth during the November 1978 AAPR. Initial planning for the AVNEC has been completed with Army aviation proponent centers, U.S. Army Combined Arms Center Development Activity (CACDA) and TRADOC.

Invitations to the 4-day conference have been sent to more than 100 general officers and equivalent civilians (major general and below). The attendees will be divided among four workshops:

- Army Aviation "How to Fight" Offense
- Army Aviation "How to Fight" Defense
- Interoperability/Standardization
- Army Aviation Personnel and Training Problems

Twenty-six issue papers dealing with key Army aviation problems under the above general headings have been developed by an Aviation Center Ad Hoc group and are undergoing field review by major commands worldwide.

At the Aviation Center, the Director of Combat Development (DCD), Colonel Robert L. Sauers, has been given the lead for AVNEC planning and development. The USAAVNC DCD project officer is Major Frank T. Peterlin (AV 558-3702/3773). Later issues of the ***AVIATION DIGEST*** will contain AVNEC results and discussions of selected issues of wide interest to ***DIGEST*** readers.